UNDERGRADUATE AREA OF EMPHASIS IN SYSTEMS ENGINEERING

Background: In recent years the field of systems engineering has witnessed great growth in the public and private sectors in the United States. This growth partially stems from the fact that the Department of Defense (DOD) is requiring contractors to include sound SE principles and techniques in their programs. Systems Engineering (SE) deals with the application of cost-cutting and rework-avoidance tools and techniques in the design and development of products and services throughout their life cycle. The industry across many disciplines is starting to apply SE techniques in product design and development. Many corporations are setting up specific career paths in systems engineering.

Systems Engineering AOE Features:
DES proposes a three-course AOE for the seniors within the College of Engineering (COE). Students interested in this SE AOE can select three from the four courses listed below:

SYS 4100/ENM 5100 Quality Engineering (Bi-level)
SYS 4200/SYS 5200 Project Engineering (Bi-level)
SYS 4310/SYS 5310 Systems Engineering Principles (Bi-level)
SYS 4460/SYS 5460 Systems Requirements Analysis (Bi-level)

These courses will be dual-offered along with their existing graduate counterparts.

Undergraduate and graduate students could sign up for each class simultaneously using the graduate or undergraduate codes and the instructor would distinguish the work load and expectations between the undergraduate and graduate students. These courses would serve as electives for engineering undergraduate students.

COE undergraduate students fulfilling criteria under Fast Track Master’s Program can also take up to two 5000 level courses from the above list. In this case, requirements listed in the Fast Track document will apply.

It should be noted that if a student uses the course as part of their undergraduate degree, the course does not count for the graduate degree. This should not be a major factor because DES will have different performance expectations for undergraduate and graduates already built in the course. If the student later wants to work on a systems engineering or engineering master’s degree and they have taken the undergraduate version of a course, DES could grant them a waiver and substitute another course in its place.

Start Dates: Fall 2009

Long-term Perspective: It is anticipated that the area of emphasis will evolve into a full-fledged Minor in the next few years. Demand and the COE strategy will determine this development. In the long-term, the systems engineering minor may lead to a Bachelor’s degree in Systems Engineering.
To: Antionet Mortara, Director of Graduate Programs

From: Dr. Muzaffar Shafiq, Associate Provost for Academic Outreach, Department Head

Through: Dr. Edward Kalajian, Associate Dean of Academics and Chair of COE College Council

Date: February 19, 2009

Subject: Bi-Level Courses for Undergraduate Area of Emphasis in Systems Engineering (AOE – SE)

Approval Request: The College of Engineering seeks Graduate Council permission to offer four graduate level courses as Bi-Level for undergraduate engineering students. Eligible engineering students will select three out of these four courses (refer to Exhibit A for details). These courses are:

ENM 5100 Quality Engineering; Bi-Level Number: SYS 4100
SYS 5200 Project Engineering; Bi-Level Number: SYS 4200
SYS 5310 Systems Engineering Principles; Bi-Level Number: SYS 4310
SYS 5460 Systems Requirement Analysis; Bi-Level Number: SYS 4460

These graduate courses have been previously approved. After Graduate Council approval, undergraduate versions of these courses will be submitted to the Undergraduate Curriculum Committee for approval.

Package Inclusions:

1. This Cover Letter Justifying the Need
2. Exhibit A: Description of Undergraduate Area of Emphasis in Systems Engineering.
3. ‘Adding a New Course to the Curriculum’ forms for Undergraduate courses
4. Syllabi for Undergraduate Courses

Justification:

1. The Department of Engineering Systems is introducing an Area of Emphasis in Systems Engineering for undergraduate engineering students. (Refer to Exhibit A for details). This necessitated introduction of SE courses at an undergraduate level.
2. Above course pairings assigned as Bi-Level will result in effective utilization of limited resources currently available in the College of Engineering.
Florida Institute of Technology

Adding a New Course to the Curriculum

This course is available for student registration only after the approval process has been completed.

Subject: SYS  
Course No.: 4100  
Credit Hours: 3  
Term to Be Added to the File: Fall 2009  
Class Hours: 45  
Lecture Hours:  
Lab Hours:  
Contact Hours (CEU Only):  
Department: Engineering Systems  
Schedule Type: Lecture (A)

☐ College of Aeronautics—23  ☐ College of Psychology and Liberal Arts—25  
☐ College of Business—24  ☐ College of Science—26  
☒ College of Engineering—01  ☐ University College Extended Studies—27

Computer Title: Restricted to 25 characters, including spaces  
Quality Engineering

Catalog Title: Quality Engineering

Catalog Description of Course: Limited to 350 characters, including spaces

Provides principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality objectives and product/process engineering to improve system performance. (Requirement: Junior standing and instructor approval.)

In addition, you may attach a course syllabus and/or more detailed description.

Restrictions

☒ Prerequisite: MTH 2201  
Course Number:  
☐ Corequisite:  
Course Number:  
☐ Prerequisite:  
Course Number:  
☐ Corequisite:  
Course Number:  
☐ Prerequisite:  
Course Number:  
☐ Corequisite:  
Course Number:  

Grades to be Issued

☒ A, B, C, D, F  
☐ A, B, C, D, F, CEU  
☐ CEU  
☐ S, U  
☐ P, F  
☐ Other

Additional Restriction:  
Junior standing; instructor approval

(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in Banner, please indicate old course information

Subject: Alpha Prefix (e.g., CSE)  
Course No. (e.g., 1301)

Approvals: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Meredith Schultz  
3/3/09  
Chair, Graduate Council

Bheim  
3/3/09  
Chair, Undergraduate Curriculum Committee

Department Head/Program Chair

Dean or Associate Dean

3-3-09

Catalog Director

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150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827
SYS 4100 Quality Engineering

2009-10 Catalog Data: SYS 4100 Quality Engineering.
Provides principles and techniques for establishing quality goals, identification of customer needs and requirements, measurement of quality objectives and product/process engineering to improve system performance. (Requirement: Junior standing and instructor approval.)

Required __ or Elective X:

Prerequisites by Topic:
1. Ability to grasp and apply probability and statistical concepts
2. Ability to understand and apply basic linear algebra and differential equations
3. Ability to comprehend and apply fundamental principles in calculus
4. Ability to apply fundamental physical principles
5. Ability to communicate effectively
6. Ability to work effectively in a team environment

Textbook (T) and References (R):

Course Learning Outcomes: The student will be able to:
1. Exhibit a practical working knowledge, as well as knowledge of background theory, of quality systems and TQM
2. Apply the seven basic and seven advanced quality engineering tools
3. Prepare a quality function deployment
4. Demonstrate statistical process control techniques
5. Analyze systems, services, products or processes using quality engineering methods
6. Incorporate effective communications techniques and methods
7. Assess Ethical and international quality issues

Topics Covered and Associated Time:
1. Quality - Concept, Philosophy, and Systems (1 class)
2. Products, Processes, and Human Performance (1 class)
3. Robust Performance (1 class)
4. Basic Tools and Process Flow Charts (1 class)
5. Advanced Tools and Benchmarking (1 class)
6. Quality Function Deployment (1 class)
7. Failure Mode Analysis (1 class)
8. Logic Trees, Design Review, and Value Analysis (1 class)
9. Statistical Process Control I, Control Charts (1 class)
10. Statistical Process Control II, Process Stability, Tolerance, and Product Acceptance (1 class)
11. Designed Experiments - Single & Multiple Factor Designs (1 class)
12. Designed Experiments - Response Surface and Taguchi Models (1 class)
13. Transforming Organizations to a Quality Focus (1 class)
14. Current Topics Focus (1 class)

Class/Lab/Recitation Schedule: 1 (two hours and fifty minute) lecture per week

Contribution of Course to Meeting the Professional Component:
This course contributes to the requirement of one-and-one-half years of engineering coursework as an elective. It also contributes to the development of student’s analytical and critical thinking skills and fosters the ability to apply contemporary quality engineering tools, methods, and methodologies.

Relationship of Course to Program Outcomes:
The material covered in this course applies to outcomes (a) ability to apply knowledge of mathematics and science – specifically statistics, and statistical process control, (b) an ability to design and conduct experiments, as well as analyze and interpret data – specifically designed experiments, (d) an ability to function on multi-disciplinary teams, (e) ability to solve engineering problems with non-technical constraints – specifically logic trees and quality functional deployment, (g) an ability to communicate effectively, (h) understanding of the impact of engineering solutions in a global and societal context – specifically in human performance and transforming organizations to a quality focus, and (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared By: William Arrasmith, PhD, Professor, February 2009
Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This course is available for student registration only after the approval process has been completed.

SUBJECT  SYS
COURSE NO.  4200
CREDIT HOURS  3
TERM TO BE ADDED TO THE FILE  Fall 2009
(ALPHA PREFIX (e.g., CSE)

CLASS HOURS  45
LECTURE HOURS  ,
LAB HOURS  ,
CONTACT HOURS (CEU ONLY)  

DEPARTMENT  Engineering Systems
(SCHEDULE TYPE  Lecture (A)

☐ COLLEGE OF AERONAUTICS--23
☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS--25
☐ COLLEGE OF BUSINESS--24
☐ COLLEGE OF SCIENCE--26
☒ COLLEGE OF ENGINEERING--01
☐ UNIVERSITY COLLEGE EXTENDED STUDIES--27

COMPUTER TITLE  Restricted to 25 characters, including spaces  Project Engineering

CATALOG TITLE  Project Engineering

CATALOG DESCRIPTION OF COURSE  Limited to 350 characters, including spaces

Provides principles of project management to design and develop products and services within budget, on time and to specification. Includes work planning, organization design, requirements analysis, project control and PERT/CPM. (Requirement: Junior standing and instructor approval.)

In addition, you may attach a course syllabus and/or more detailed description.

RESTRICTIONS  ☒ Prerequisite  MTH 2201  ☐ Corequisite  Course Number  
☐ Prerequisite  Course Number
☐ Prerequisite  Course Number
☐ Corequisite  Course Number

GRADES TO BE ISSUED  ☒ A, B, C, D, F
☐ A, B, C, D, F, CEU
☐ CEU
☐ S, U
☐ P, F
☐ Other

ADDITIONAL RESTRICTION  Junior standing; instructor approval  (e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information

SUBJECT  SYS
COURSE NO.  1301

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Meresfetter Scholtens  3/3/09

Chair, Graduate Council  Date

Department Head/Program Chair  3/3/09

Chair, Undergraduate Curriculum Committee  Date

Dean or Associate Dean  3-3-09

CATALOG DIRECTOR  Date

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RGS-271-5081
SYS 4200 Project Engineering

2009-10 Catalog Data: SYS 4200 Project Engineering 3 Credits.
Provides principles of project management to design and develop products and services within budget, on time and to specification. Includes work planning, organization design, requirements analysis, project control and PERT/CPM. (Requirement: Junior standing and instructor approval.)

Required __or Elective X :

Prerequisites by Topic:
1. Ability to grasp and apply probability and statistical concepts
2. Ability to understand and apply basic linear algebra and differential equations
3. Ability to comprehend and apply fundamental principles in calculus
4. Ability to apply fundamental physical principles
5. Ability to communicate effectively
6. Ability to work effectively in a team environment

Textbook (T) and References (R):
Project Management: A Managerial Approach 6th Edition (Wiley) by Meredith & Mantel is the principal text. A variety of Systems Engineering texts and handouts will serve as references. Also, a number of web sites will be referenced and used during the course. Note that the text includes a CD with a trial version of Microsoft Project.

Course Learning Outcomes: The student will be able to:
1. Exhibit a practical working knowledge of project engineering
2. Apply fundamental leadership principles
3. Demonstrate negotiation and conflict resolution methods
4. Incorporate effective project planning and control methods
5. Analyze systems, services, products or processes using effective project engineering methods
6. Evaluate project performance using earned value methods
7. Assess budgets, schedules, and technical plans
8. Prepare a project risk analysis

Topics Covered and Associated Time:
1. Introduction to Project Management and Systems Engineering (1 class)
2. Project Selection and Performance Criteria (1 class)
3. Project Leadership (1 class)
4. Project Scope, Requirements Engineering, Analysis, and Allocation (1 class)
5. Project Organization and Team Building (1 class)
6. Negotiation and Conflict Resolution (1 class)
7. Project Planning and Work Breakdowns (1 class)
8. Budgets and Cost Estimation (1 class)
9. Scheduling and Sequencing (1 class)
10. Resource Allocation (1 class)
11. Project Monitoring and Control (1 class)
12. Risk Assessment and Management (1 class)
13. Systems Engineering Issues and Processes (1 class)
14. Project Termination, Auditing, and Evolving Issues (1 class)
15. Final Exam/Project Presentations and Review (1 class)

**Class/Lab/Recitation Schedule:** 1 (two hour and fifty minute) lecture per week

**Contribution of Course to Meeting the Professional Component:**
This course contributes to the requirement of one-and-one-half years of engineering coursework as an elective. It also contributes to the development of student’s analytical and critical thinking skills and fosters the ability to apply contemporary project engineering tools, methods, and methodologies.

**Relationship of Course to Program Outcomes:**
The material covered in this course applies to outcomes (a) ability to apply knowledge of mathematics and science – specifically statistics in decision modeling, project selection modeling, and resource allocation, (c) an ability to design a system, component, or process to meet a desired need – specifically requirements engineering and project planning, (d) an ability to function on multi-disciplinary teams, (e) ability to solve engineering problems with non-technical constraints – specifically system engineering issues and processes, (f) an understanding of professional and ethical responsibility – specifically project leadership, negotiation and conflict resolution, and evolving issues, (g) an ability to communicate effectively, (h) understanding of the impact of engineering solutions in a global and societal context – specifically in negotiations and project control, and (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Prepared By:** William Arrasmith, PhD, Professor, February 2009
Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This course is available for student registration only after the approval process has been completed.

SUBJECT SYS COURSE NO. 4310 CREDIT HOURS 3 TERM TO BE ADDED TO THE FILE Fall 2009
Alpha Prefix (e.g., CSE) Number Choice (e.g., 1301) (e.g., Fall 2006)

CLASS HOURS 45 LECTURE HOURS LAB HOURS CONTACT HOURS (CEU ONLY)

DEPARTMENT Engineering Systems SCHEDULE TYPE Lecture (A)
(e.g., Computer Sciences) (e.g., Lecture, Lab or Special Project)

☐ COLLEGE OF AERONAUTICS-23 ☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS-25
☐ COLLEGE OF BUSINESS-24 ☐ COLLEGE OF SCIENCE-26
☒ COLLEGE OF ENGINEERING-01 ☐ UNIVERSITY COLLEGE EXTENDED STUDIES-27

COMPUTER TITLE Restricted to 25 characters, including spaces Sys Eng Principles

CATALOG TITLE Systems Engineering Principles

CATALOG DESCRIPTION OF COURSE Limited to 350 characters, including spaces
Introduces the principles in systems engineering (SE) that deal with system life cycle phases. Emphasizes requirements and design methodologies. Includes SE definition; life cycle methodologies, tools and techniques; evaluation of system and technology alternatives; reliability and maintainability; trade-off models; and management tools and techniques. (Requirements: Junior standing and instructor approval.)

In addition, you may attach a course syllabus and/or more detailed description.

RESTRICTIONS ☒ Prerequisite MTH 2201 ☐ Corequisite Course Number
☐ Prerequisite Course Number ☐ Corequisite Course Number
☐ Prerequisite Course Number ☐ Corequisite Course Number

ADDITIONAL RESTRICTION Junior standing; instructor approval (e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information

SUBJECT Alpha Prefix (e.g., CSE) COURSE NO. (e.g., 1301)

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Originator 3/3/09 Date Chair, Graduate Council Date

3/3/09 Date OR

Chair, Undergraduate Curriculum Committee Date

CATALOG DIRECTOR
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Catalog Director  Date

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SYS 4310 Systems Engineering Principles

2009-10 Catalog Data: SYS 4310 Systems Engineering Principles 3 Credits.
Introduces the principles in systems engineering (SE) that deal with system life cycle phases. Emphasizes requirements and design methodologies. Includes SE definition; life cycle methodologies, tools and techniques; evaluation of system and technology alternatives; reliability and maintainability; trade-off models; and management tools and techniques. (Requirements: Junior standing and instructor approval.)

Required _or Elective X:

Prerequisites by Topic:
1. Ability to grasp and apply probability and statistical concepts
2. Ability to understand and apply basic linear algebra and differential equations
3. Ability to comprehend and apply fundamental principles in calculus
4. Ability to apply fundamental physical principles
5. Ability to communicate effectively
6. Ability to work effectively in a team environment

Textbook (T) and References (R):

Additional Resources:
3. My notes, and handouts from other books. All information is provided on Angel (https://courses.fit.edu)
4. Guest Lectures
5. Journal Articles

Course Learning Outcomes: The student will be able to:
1. Demonstrate a working knowledge of SE techniques and design practices
2. Employ contemporary methods in evaluating alternatives
3. Interpret Failure Mode Effects and Criticality Analysis (FMECA’s) results
4. Apply Hypothesis Testing methods
5. Analyze requirements and assess adherence to system requirements
6. Predict system reliability, maintainability, and availability
7. Plan for proper use of SE standards and external models
Topics Covered and Associated Time:
1. Introduction to Systems Engineering (1 class)
2. The System Engineering Process and Life Cycle (1 class)
3. Dataflow Diagrams (DFD) – A Process Technique (1 class)
4. Alternative Analysis (1 class)
5. Risk Management (1 class)
6. System Engineering Requirements and Analysis (1 class)
7. System Engineering Specifications (1 class)
8. System Design Methods (2 classes)
9. Taguchi Method (1 class)
10. Hypothesis Testing Methods (1 class)
11. System Reliability, Maintainability, and Availability (1 class)
12. Cost Tradeoff Analysis (1 class)
13. Resource Allocation: Cost As an Independent Variable (1 class)
14. SE Standards and External Models (1 class)

Class/Lab/Recitation Schedule: 1 (two hour and fifty minute) lecture per week

Contribution of Course to Meeting the Professional Component:
This course contributes to the requirement of one-and-one-half years of engineering coursework as an elective. It also contributes to the development of student’s analytical and critical thinking skills and fosters the ability to apply contemporary system engineering tools, methods, and methodologies.

Relationship of Course to Program Outcomes:
The material covered in this course applies to outcomes (a) ability to apply knowledge of mathematics and science – specifically statistics in hypothesis testing, reliability, maintainability, and availability analysis (c) an ability to design a system, component, or process to meet a desired need – specifically system engineering requirements and analysis, system engineering specification, and system design methods, (d) an ability to function on multi-disciplinary teams, (e) ability to solve engineering problems with non-technical constraints – specifically alternative analysis, (g) an ability to communicate effectively, (h) understanding of the impact of engineering solutions in a global and societal context – specifically SE standards and external models, and (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared By: William Arrasmith, PhD, Professor, February 2009
Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This course is available for student registration only after the approval process has been completed.

SUBJECT   SYS  COURSE NO. 4460  CREDIT HOURS 3  TERM TO BE ADDED TO THE FILE Fall 2009
Alpha Prefix (e.g., CSE)  Number Choice (e.g., 1301)  (e.g., Fall 2006)

CLASS HOURS 45  LECTURE HOURS  Lab Hours CONTACT HOURS (CEU ONLY)

DEPARTMENT  Engineering Systems  SCHEDULE TYPE  Lecture (A)
(e.g., Computer Sciences)  (e.g., Lecture, Lab or Special Project)

☐ COLLEGE OF AERONAUTICS-23  ☐ COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS-25
☐ COLLEGE OF BUSINESS-24  ☐ COLLEGE OF SCIENCE-26
☑ COLLEGE OF ENGINEERING-01  ☐ UNIVERSITY COLLEGE EXTENDED STUDIES-27

COMPUTER TITLE  Restricted to 25 characters, including spaces  Systems Req Analysis

CATALOG TITLE  Systems Requirements Analysis

CATALOG DESCRIPTION OF COURSE  Limited to 350 characters, including spaces

Provides an in-depth study of systems requirements processes and tools. Includes concepts such as capturing stakeholder requirements, the importance of the concept of operations and the system development life-cycle process. (Requirements: Junior standing and instructor approval.)

In addition, you may attach a course syllabus and/or more detailed description.

RESTRICTIONS  ☑ Prerequisite  MTH 2201  ☐ Corequisite  Course Number
  ☐ Prerequisite  Course Number  ☐ Corequisite  Course Number
  ☐ Prerequisite  Course Number  ☐ Corequisite  Course Number

GRADES TO BE ISSUED  ☑ A, B, C, D, F  ☐ A, B, C, D, F, CEU
  ☐ CEU  ☐ S, U  ☐ P, F  ☐ Other

ADDITIONAL RESTRICTION  Junior standing; instructor approval
  (e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information

SUBJECT  Alpha Prefix (e.g., CSE)  COURSE NO. (e.g., 1301)

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

Meredith Eckert 3/3/09  Chair, Graduate Council  Date

M. St. John 3/3/09  OR

Dean or Associate Dean  Date  Chair, Undergraduate Curriculum Committee

CATALOG DIRECTOR

These changes/additions have been made for the University/Extended Studies Catalog and entered into the BANNER term named above.

Date

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150 West University Boulevard, Melbourne, FL 32901-6975 • (321) 674-8114 • Fax (321) 674-7827
SYS 4460 Systems Requirements Analysis

2009-10 Catalog Data: SYS 4460 Systems Requirements Analysis  3 Credits. Provides an in-depth study of systems requirements processes and tools. Includes concepts such as capturing stakeholder requirements, the importance of the concept of operations and the system development life-cycle process. (Requirements: Junior standing and instructor approval.)

Required _or Elective X_:

Prerequisites by Topic:
1. The student should have a fundamental understanding of the place of the system requirements development effort within the overall context of system development (i.e. at the beginning of a project, after initial system concept but before preliminary system design)
2. The student should be adept at following formalized technical processes, performing technical writing, and working in a group environment
3. A basic working knowledge of industry standards, esp. Unified Modeling Language (UML), ISO9001, and the Capability Maturity Model Integration (CMMI) is useful but not required

Textbook (T) and References (R):

Course Learning Outcomes:
1. The student will recognize the need for a formal, rigorous requirements development phase within the development of systems
2. The student will apply the process flow of a formal requirements development phase: system context model → business events → business use cases → product use cases and scenarios → requirements extraction → requirements write-up and validation
3. The student will assess the structure, function, similarities, and differences of the three major categories of requirements: functional, nonfunctional, and constraints
4. The student will employ basic tools for assisting in the requirements development effort, including use cases, scenarios, and prototypes
5. The student will compare techniques for: getting the requirements development phase off to a good start, finding and extracting requirements, writing requirements in a consistent fashion, preventing, finding, and fixing problems with requirements, and reviewing and validating requirements
Topics Covered and Associated Time:
1. The Requirements Process (1 class)
2. Project Blastoff (1 class)
3. Event Driven Use Cases (1 class)
4. Trawling for Requirements (1 class)
5. Scenarios and Requirements (1 class)
6. Functional Requirements (1 class)
7. Nonfunctional Requirements (1 class)
8. Fit Criteria (1 class)
9. Writing the Requirements (1 class)
10. The Quality Gateway (1 class)
11. Prototyping the Requirements (1 class)
12. Reusing the Requirements (1 class)
13. Reviewing the Specification Whither Requirements? (1 class)
14. Final Presentations (1 class)
15. Examinations (2 classes)

Class/Lab/Recitation Schedule: 1 (two hour and fifty minute) lecture per week

Contribution of Course to Meeting the Professional Component:
The discovery and development of system requirements is an integral part of the design of any complex system. A lack of familiarity with the theory and practice of formally and rigorously defining system requirements means that a critical body of knowledge involved with the development and management of systems is missing, and the student will be ill equipped to work well with projects that are in that stage of development.

Relationship of Course to Program Outcomes:
Studies of both systems that were successfully developed and those that failed have revealed that one of the most vital (and often one of the most overlooked) elements of the system development process is that of a formal, rigorous system requirements design phase. These same studies have shown that:
- The systems that were most likely to succeed were those that had such a phase
- Systems that utilized such phases were able to substantially reduce the number and types of errors within their requirements specifications

In short, having a formal, rigorous system requirements design phase can easily mean the difference between having a program that succeeds in fielding a product that is both useful and well-received, and a program that either is cancelled outright or is constantly on the verge of being cancelled.

Prepared By: Barry Webster, PhD, Assistant Professor, February 2009