

# 2014-2015 LONG SIGNATURE SHEET

Proposal Number: SIS ~~ITIS~~ 08-29-14



UNC CHARLOTTE

Proposal Title: New graduate course ITIS ~~6450/8450~~ <sup>6350/8350</sup> Rapid Prototyping Design Patterns

Originating Department: Software and Information Systems (ITIS)

TYPE OF PROPOSAL: UNDERGRADUATE \_\_\_\_\_ GRADUATE X UNDERGRADUATE & GRADUATE \_\_\_\_\_  
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
11/10/14	11/10/14	11/4/14	Approved	<u>DEPARTMENT CHAIR</u>  [print name here:] Mary Lou Maher
11/19/14	11/19/14	11/19/14	Approved	<u>COLLEGE CURRICULUM COMMITTEE CHAIR</u>  [print name here:] Yuliang Zheng
11/19/14	12/1/14	12/8/14	Approved	<u>COLLEGE FACULTY CHAIR (if applicable)</u>  [print name here:] SRINIVAS ARELLA
			Approved	<u>COLLEGE DEAN</u>  [print name here:] Yi Deng
			Approved	<u>GENERAL EDUCATION</u> (if applicable; for General Education courses) [print name here:]
			Approved	<u>HONORS COLLEGE</u> (if applicable; for Honors courses & programs) [print name here:]
			Approved	<u>UNDERGRADUATE COURSE &amp; CURRICULUM COMMITTEE CHAIR</u> (for undergraduate content)
12-10-14	1-6-15	2-19-15	Approved	<u>GRADUATE COUNCIL CHAIR</u> (for graduate content)  ALAN R. FREITAG
				<u>FACULTY GOVERNANCE ASSISTANT</u> (Faculty Council approval on Consent Calendar)
				<u>FACULTY EXECUTIVE COMMITTEE</u> (if decision is appealed)



# UNC CHARLOTTE

## LONG FORM COURSE AND CURRICULUM PROPOSAL

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\*To: The Graduate Council

From: College of Computing and Informatics

Date: August 28, 2014

Re: New graduate course ITIS 6350/8350 Rapid Prototyping Design Patterns

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The Long Form is used for major curriculum changes. Examples of major changes can include:

**Undergraduate:** Major changes include new undergraduate degrees, minors, concentrations, certificates, and changes to more than 50% of an existing program (Note: changing the name of an academic department does not automatically change the name(s) of the degree(s). The requests must be approved separately by the Board of Governors.)

**Graduate:** Major changes include new graduate courses, major changes to an existing graduate course or major changes to an existing graduate program

Submission of this Long Form indicates review and assessment of the proposed curriculum changes at the department and collegiate level either separately or as part of ongoing assessment efforts.

\*Proposals for undergraduate courses and programs should be sent to the Undergraduate Course and Curriculum Committee Chair. Proposals related to both undergraduate and graduate courses, (e.g., courses co-listed at both levels) must be sent to both the Undergraduate Course and Curriculum Committee and the Graduate Council.

**UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE**

**NEW UNDERGRADUATE AND GRADUATE**

**ITIS 08-28-14**

**COURSE PROPOSAL FROM: DEPARTMENT OF SOFTWARE AND INFORMATION SYSTEMS**

**TITLE: NEW GRADUATE COURSE ITIS 6350/8350 RAPID PROTOTYPING DESIGN PATTERNS**

**A. PROPOSAL SUMMARY.**

**1. SUMMARY:**

The Department of Software and Information Systems proposes to create a new course, ITIS 6350 Rapid Prototyping Design Patterns and ITIS 8350 Rapid Prototyping Design Patterns. This course is designed to teach students about the different ways that software systems can be prototyped prior to code implementation, and how to make use of common interface and interaction design patterns in this process. This course is intended for SIS majors at the masters and PhD levels.

**B. JUSTIFICATION**

**1. NEED:**

Implementing interactive systems involves a huge amount of time, effort and expense. Implementing the wrong type of system, the wrong features and/or the wrong interaction techniques leads to massive waste of precious resources. Rapid prototyping techniques can help to insure that a new or revamped system can be iterated on through user-testing before it is implemented. Students will learn how to quickly and cheaply create different forms of rapid prototypes, ranging from simple sketches, to elaborate interactive digital prototypes. As a part of this process, students will learn about common interaction and interface design patterns and how to represent these patterns in prototypes.

**2. PREREQUISITES/COREQUISITES:**

6350: Permission of department  
8350: PhD standing.

**3. COURSE NUMBERING:**

ITIS 6350 is intended to be a Masters level course, ITIS 8350 is intended to be a PhD level course for students in Software and Information Systems and Computer Science. The 64XX numbering (6350/8350) reflects the fact that the course fits in the same

human-centered design area as the core HCI foundations course, which is numbered as 6400/8400.

**4. EFFECT ON SCOPE, QUALITY, AND EFFICIENCY:**

The proposed courses will broaden the scope of the software and information systems curriculum to include hands-on experience building many different styles of software prototypes. The course will allow students the flexibility to prototype software for any platform they are interested in: desktop/laptop applications, touchscreen tablet applications, mobile smartphones, tangible devices, etc. Rapid Prototyping can be seen as a communication skill and design patterns can be seen as the vocabulary of interfaces and interaction. Equipping our students with these skills and vocabulary will enable our graduates to be more efficient software developers and hit the ground running in any development environment.

**C. IMPACT.**

**1. STUDENTS SERVED:**

This course provides graduate majors in information technology with an option for an elective course that would enhance their value to potential employers.

**2. EFFECT ON EXISTING COURSES AND CURRICULA:**

- a. ITIS 6350/8350 will be offered in the spring or fall.
- b. The content/frequency of other courses will not be affected.
- c. The anticipated enrollment is 20 students for ITIS 6350 and 5 for ITIS 8350.
- d. Impact on enrollments in other elective courses will be minimal as it will be an elective course and the department offers a set number of electives each year.
- e. The proposed scope will not be covered in other existing courses.
- f. Other areas of catalog copy affected: The proposed courses should be listed as elective options.

**D. RESOURCES REQUIRED TO SUPPORT PROPOSAL**

**1. PERSONNEL:**

- a. Specify requirements for new faculty, part-time teaching, student assistants and/or increased load on present faculty.

No new faculty members are needed to teach these courses.

- b. List by name qualified faculty members interested in teaching the course(s).

In general, research faculty in human computer interaction areas are qualified to offer this course. In particular, Celine Latulipe, Khai Truong, Heather Lipford, and Mary Lou Maher are interested in offering this course.

**2. PHYSICAL FACILITY:**

No new physical facilities are needed.

**3. EQUIPMENT AND SUPPLIES:**

No new equipment and supplies are needed to teach the courses.

**4. COMPUTER:**

Specify any computer usage (beyond Moodle) required by students and/or faculty, and include an assessment of the adequacy of software/computing resources by available for the course(s).

Existing computer laboratories on campus or students' own personal computers will suffice as a computational platform for this course.

**5. AUDIO-VISUAL:**

If there are requirements for audio-visual facilities beyond the standard classroom podiums, please list those here.

Current facilities are adequate to support this course.

**6. OTHER RESOURCES:**

Specify and estimate cost of other new/added resources required, e.g., travel, communication, printing and binding.

None.

**7. SOURCE OF FUNDING:**

Indicate source(s) of funding for new/additional resources required to support this proposal.

None.

**E. CONSULTATION WITH THE LIBRARY AND OTHER DEPARTMENTS OR UNITS**

**1. LIBRARY CONSULTATION:**

Library consultation was initiated on October 22, 2014 and completed October 24, 2014.

**2. CONSULTATION WITH OTHER DEPARTMENTS OR UNITS:**

Consultation with the Department of Computer Science was initiated on October 22, 2014 and completed November 17, 2014.

**F. INITIATION, ATTACHMENTS AND CONSIDERATION OF THE PROPOSAL**

**1. ORIGINATING UNIT:**

Approved by the Software and Information Systems faculty on October 24, 2014 and by the College of Computing and Informatics faculty on October 26, 2014.

**2. CREDIT HOUR:**

Review statement and check box once completed:

- The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a [credit hour](#).

**3. ATTACHMENTS:**

**1. CONSULTATION:**

- Appendix I. Library consultation
- Appendix II. Department of Computer Science consultation

**2. COURSE OUTLINE/SYLLABUS:**

- Appendix III. ITIS 6350/8350 Syllabus.

**3. PROPOSED CATALOG COPY:**

- Appendix IV. Proposed Catalog Copy

a. For a new course or revisions to an existing course, check all the statements that apply:

This course will be cross listed with another course.

There are prerequisites for this course.

There are corequisites for this course.

This course is repeatable for credit.

This course will increase/decrease the number of credits hours currently offered by its program.

This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

**4. ACADEMIC PLAN OF STUDY (UNDERGRADUATE ONLY):** Does the proposed change impact an [existing Academic Plan of Study](#)?

Yes. If yes, please provide updated Academic Plan of Study in template format.

No.

**5. STUDENT LEARNING OUTCOMES (UNDERGRADUATE & GRADUATE):** Does this course or curricular change require a change in Student Learning Outcomes (SLOs) or assessment for the degree program?

Yes. If yes, please provide updated SLOs in template format.

No.

**6. TEXTBOOK COSTS:** It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?

Yes. Briefly explain below.

No. Briefly explain below.

The textbooks for this course are available at low cost (\$35 and \$16) and are also available for rental through Amazon.com.

**IMPORTANT NOTE:** A Microsoft Word version of the final course and curriculum proposal should be sent to [facultygovernance@uncc.edu](mailto:facultygovernance@uncc.edu) upon approval by the Undergraduate Course and Curriculum Committee and/or Graduate Council chair.

**Appendix I: Library Consultation**



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**Summary of Librarian's Evaluation of Holdings:**

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*Melanie Sorrell*

**Evaluator's Signature**




## Appendix II: Department of Computer Science Consultation

Department of Computer Science is satisfied with this course. They suggest clarifying whether students are required to do any coded implementation. We have added a line to the course description to clarify.

ITIS 6450/8450, Rapid Prototyping Design Patterns

Inbox x



 **Cukic, Bojan**  
to Celine ▾

1:32 PM (2 hours ago) ☆



Dear Celine,  
Graduate Curriculum Committee in the Department of Computer Science has taken into consideration the proposed class, ITIS 6450/8450, Rapid Prototyping Design Patterns. It is my pleasure to report that the committee approved the proposed class. I look forward having the new class offered to graduate students in SIS and CS department.  
Regards,

Bojan Cukic  
Professor and Chair  
Department of Computer Science  
University of North Carolina at Charlotte

## Appendix III. ITIS 6350/8350 Syllabus.

### ITIS 6350/8350 Rapid Prototyping Design Patterns

#### Syllabus

#### Course Description

This course is an active learning course designed to expose students to the many forms of rapid prototyping software and devices. The focus is on the use of common design patterns and how to represent them quickly and inexpensively for the purpose of allowing many rapid design iterations prior to the coding of solutions. This course can be considered a communication course where communication between designers and developers occurs through prototyped artifacts and accompanying documentation. Design patterns can be considered the vocabulary of interaction and interface design, and so learning this vocabulary is an important aspect of the course. Prototyping in this course spans all types of devices and platforms: desktop, mobile, web, tabletop, tablet, etc. The theory of rapid prototyping is covered in video lectures that are consumed as part of the student's preparation outside of class. Class time is devoted to hands on practice of the various rapid prototyping methods. Assignments involve applying the techniques learned in class to a variety of problem spaces and platforms, and the peer-critique of other student's designs. Evaluation is based on both understanding of the theory and on the methodological skills gained, as demonstrated through the individual or paired assignments. Programmatically coded implementations of prototype designs are NOT part of this course.

**Prerequisite: 6350: Permission of Department, 8350: PhD standing.**

**3 credit hours.**

#### Topics

- Prototyping Theory
  - a. Prototyping as communication
  - b. Content Aspects
  - c. Content-Fidelity Matrix
  - d. Participatory Design
  - e. Throwaway vs. Evolutionary Prototyping
  - f. Wizard of Oz evaluation
  - g. Platform Aspects
  - h. Design Critique
- Prototyping Methods
  - a. Sketching
  - b. Wireframing
  - c. Storyboarding
  - d. Card sorting
  - e. Paper prototyping
  - f. Video prototyping
  - g. Interactive Digital (non-coded) prototyping
    - i. PPT
    - ii. Balsamiq
    - iii. Axure
    - iv. Etc.

- h. Physical Prototyping
  - i. Clay
  - ii. 3D printing
  - iii. Arduino/Phidgets
- Design Patterns
  - a. Navigation Models
  - b. Visual Layout patterns
  - c. Interaction patterns

### **Learning Objectives**

- Experiences with a wide variety of prototyping methods, both digital and non-digital
- An understanding of the theory behind rapid prototyping (costs, benefits, iteration, etc.)
- Knowledge of how to create and edit videos of designs as a critical form of communication
- Experience in how to critique interaction designs, and how to deal with critique of one's own designs
- For ITIS 8150 only: Ability to write a scholarly article on rapid prototyping or design patterns

### **Instructional Method**

The course will be taught as a flipped class: with content delivered via homework videos and quizzes, followed by 3 hours per week in a lab setting in which students participate individually and in pairs or teams. The lab time is devoted to active learning, usually creating multiple prototypes in response to a problem prompt.

### **Textbooks**

1. Designing Interfaces, 2<sup>nd</sup> Edition, by Jenifer Tidwell.
2. Sketching User Experiences: The Workbook, by Saul Greenberg et al.

### **Assignments and Assessment of Final Grade ITIS 6350**

- Attendance & Participation: 5%
- Homework Quizzes: 10%
- A1: Video Prototype: 10%
- A2: Storyboard & Wireframes, with writeup: 10%
- A3: Paper Prototype, with WoZ results in writeup and a Video: 15%
- A4: Digital (non-coded) Prototype, with Video: 15%
- A5: Physical Prototype: 15%
- Final Exam: 20%

### **Assignments and Assessment of Final Grade ITIS 8350**

- Attendance & Participation: 5%
- Homework Quizzes: 10%
- A1: Video Prototype: 10%
- A2: Storyboard & Wireframes, with writeup: 10%
- A3: Paper Prototype, with WoZ results in writeup and a Video: 15%
- A4: Digital (non-coded) Prototype, with Video: 15%
- A5: Physical Prototype: 15%
- Prototyping Research Paper: 10%
- Final Exam: 10%

**Grading Scheme**

A: 85-100  
 B: 70-85  
 C: 60-70  
 U: Below 60

**University and College Policies**

**Code of Student Responsibility:** The *UNC Charlotte Code of Student Responsibility* (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code” (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address: <http://legal.uncc.edu/policies/up-406>

**Academic Integrity:** All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Students are expected to submit their own work, either as individuals or contributors to a group assignment. Definitions and examples of plagiarism and other violations are set forth in the Code. The Code is available from the Dean of Students Office or online at: <http://www.legal.uncc.edu/policies/ps-105.html>

**Course Credit Workload:** This 4-credit course requires three hour of classroom activities and on average nine hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: designing, programming, group meetings, user studies and data collection, required reading, library research, written assignments.

**Special Needs:** If you have a documented disability and require accommodation in this course, contact Disability Services, Fretwell 230, phone: 687 4355 voice/TDD) the first week of the semester. Information about available services may be found at <http://legal.uncc.edu/policies/up-501>. Accommodations for learning will be arranged by that office and communicated to the Instructor. If you speak English as a second language, please inform the instructor.

**Diversity Statement:** UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (<http://legal.uncc.edu/policies/up-502>) and the policy on Responsible Use of University Computing and Electronic Communication Resources (<http://legal.uncc.edu/policies/up-307>). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

**Appendix IV. Proposed Catalog Copy.**

**ITIS 6350 Rapid Prototyping Design Patterns. (3) Prerequisites: Permission of Department.** This course is designed to teach the Rapid Prototyping Design Patterns process. This course is an active learning course designed to expose students to the many forms of rapid prototyping software and devices. The focus is on the use of common design patterns and how to represent them quickly and inexpensively for the purpose of allowing many rapid design iterations prior to the coding of solutions. This course can be considered a communication course where communication between designers and developers occurs through prototyped artifacts and accompanying documentation. Design patterns can be considered the vocabulary of interaction and interface design, and so learning this vocabulary is an important aspect of the course. Prototyping in this course spans all types of devices and platforms: desktop, mobile, web, tabletop, tablet, etc. The theory of rapid prototyping is covered in video lectures that are consumed as part of the student's preparation outside of class. Class time is devoted to hands on practice of the various rapid prototyping methods. Assignments involve applying the techniques learned in class to a variety of problem spaces and platforms, and the peer-critique of other student's designs. Evaluation is based on both understanding of the theory and on the methodological skills gained, as demonstrated through the individual or paired assignments and the final exam. Cross-listed as ITIS 8350. Offered in Spring.

**ITIS 8350 Rapid Prototyping Design Patterns. (3) Prerequisites: PhD standing.** This course is designed to teach the Rapid Prototyping Design Patterns process. This course is an active learning course designed to expose students to the many forms of rapid prototyping software and devices. The focus is on the use of common design patterns and how to represent them quickly and inexpensively for the purpose of allowing many rapid design iterations prior to the coding of solutions. This course can be considered a communication course where communication between designers and developers occurs through prototyped artifacts and accompanying documentation. Design patterns can be considered the vocabulary of interaction and interface design, and so learning this vocabulary is an important aspect of the course. Prototyping in this course spans all types of devices and platforms: desktop, mobile, web, tabletop, tablet, etc. The theory of rapid prototyping is covered in video lectures that are consumed as part of the student's preparation outside of class. Class time is devoted to hands on practice of the various rapid prototyping methods. Assignments involve applying the techniques learned in class to a variety of problem spaces and platforms, and the peer-critique of other student's designs. Evaluation is based on both understanding of the theory and on the methodological skills gained, as demonstrated through the individual or paired assignments. Students will also be expected to write a scholarly article that examines some aspect of prototyping as a part of the design process. Cross-listed as ITIS 6350. Offered in Spring.