

## **Course Name**

Empirical Research in Software Systems

## **Justification of Proposal**

All graduate students embark on the process of research. Unlike the majority of research training programs provided for graduates in universities that emphasize academic skills on review, writing, and presentation, this course brings students to the core of scientific research, and provides students with a model of the research process that can be applied to a research project, and an introduction to empirical research methods that may be selected for use within this process. In this course knowledge evolution is categorized into a three-component research model, and possible research goals are associated with each of these. Five types of research are illustrated and overlaid across the three-component research model and the research risks associated with each are outlined. Following this generic research model consideration, the course outlines both quantitative and qualitative research methods (experiments, case studies, field studies, and so on) that may be used. This course provides researchers with a general research structure, methods to develop and define the research plan, and empirical methods to be used in the research project. Extensive use is made of illustrative examples of prior research and the opportunity given to apply the principles espoused to the students own projects. It is expected that the course will provide a deeper understanding of the research process and the use of empirical methods in that process.

## **Consultation Process**

This proposal has been discussed with Ross Jeffery, Liming Zhu and Jason Zhang.

## **Load – Hours per Week**

This course will run from 9am to 5pm over 2 days including lectures and individual/group exercises. The total contact time is 12 hours. The course does not require additional workload outside these hours.

## **Course Description**

The objective of this course is to provide students with the basic but essential knowledge on key concepts in conducting empirical research in software systems. This course will position empirical research methods in the general scientific research methods. It provides detailed coverage of the various types of empirical research methods, examples of the application of these methods, traps for the unwary and mechanisms to select the most appropriate methods. During the course, student exercises will provide students with experiences in applying empirical methods to their research problems. The course will develop the student's interest and critical view of empirical research methods.

## **Proposed Teaching Methods and Assessment Practices**

The course is divided into 4 lecturing sessions and 4 workshop-style exercise sessions. The details are listed as follows:

## **Day 1**

09:00-10:30 overview of research model and research type

11:00-12:30 exercise 1: analyze research using the research model

13:30-15:00 empirical research in software systems

15:30-17:00 exercise 2: critical analysis of “problematic” research

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## **Day 2**

☐09:00-10:30 introduction to empirical methods

☐11:00-12:30 exercise 3: apply GQM to define your research

☐13:30-15:00 empirical research in action: pitfalls and method selection

☐15:30-17:00 exercise 4: select empirical methods for your research

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Some exercises could be used for assessment. In such case, a Satisfactory/ Unsatisfactory grading will be used.

## **Assessment grades to be used**

No assessment will be included in the 2011,Q4 offering. A Satisfactory/ Unsatisfactory grading will be used for future offerings if required.

## **Model of Delivery**

This course will be provided from NICTA’s ATP Lab. Teleconferencing and online streaming facilities may be available for distance learning.

## **Information Technology Requirements for Students**

No.

## **Textbooks**

There is no official textbook. A list of books and papers will be provided for reference purposes.

## **Administrative Arrangements**

- Course materials: will be available online
- Timetable coordination: TBD by NICTA
- Contingency arrangements: none
- Minimum enrolments for viability of the course: 8 students
- Maximum class sizes: 30 students
- Examination cost, invigilation, and location: TBD by NICTA
- Any other administrative requirements: none