

# A New Course Proposal: Self-paced Introduction to Computing

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## 1 Justification

Justification of the proposed course comes from two orthogonal aspects: the need of an Introduction to Computer Science course and the need of delivery in a labor efficient format - self-paced format.

Introduction to Computing offers students an opportunity to learn fundamentals of computer science, which can be taken by a broad range of students from all disciplines. Resembling Physics 100 or Music 100, the course will be designed to present a panorama of computer science to increase computer literacy of students from all majors with no necessary to bring students into computing fields. Rather, it simply is about exposing students to fundamentals of computing. However, the course will provide students sufficient and relevant information to help them make an educated decision in choosing computer science as their majors. This course emphasizes fundamental concepts.

Self-paced is used here to mainly address the conflict of foreseen demand and the limited faculty members. Since this course may attract a large number of students, the course may need multiple faculty members to cover. The self-paced format may still meet the learning needs of students without demanding significant new hiring.

## 2 Specific course objectives or student learning objectives (SLOs)

A student successfully completing this course should:

- understand the fundamental concepts and terminology of computing.
- understand basic hardware components.
- understand difference between OS software and application software.
- understand the challenges of majoring a computing field.
- understand binary data representation.
- understand basic logic.
- be able to write simple HTML pages.

- be able to read simple programs written in a popular programming language.
- improve logical thinking and computational thinking
- be more confident in using computers.
- be able to make informative decision in taking or not taking a computing related major.

If different from the accompanying syllabus, the ones on the syllabus should be more accurate.

### **3 List of topics to be covered**

1. Brief History of Computing and computers
2. Information, Knowledge, Artificial Intelligence
3. Data Representation in a Computer, Numeral Systems, binary, units of information
4. Computer Systems, Computer Architecture
5. Hardware components
6. application software
7. Operating Systems (processes, manage resources, file systems, possibly assembler instructions here).
8. CPU and instruction set
9. programming
10. generations of programming languages, assembler, compiler and interpreter
11. Program execution (line by line etc...)
12. computing field and computing career
13. Introduction to Internet
14. Mobile Computing and Cloud Computing, Android vs iOS
15. computer and society
16. cyber and network Security
17. Big Data
18. Ethics
19. sustainable computing

Also reflected in the weekly schedule on the accompanying syllabus.

## **4 Similarity to other courses**

This course is designed from scratch, different from all other courses offered inside and outside of the computer science program. Furthermore, the course is designed to be self-paced, which is currently rather unique.

The course isn't a programming course, neither a Microsoft Office course. It is an introductory course that aims to introduce fundamental computing concepts and terminologies as well as provide an overview of the computing fields to students (ideally when they are freshmen/sophomore). In particular, the proposed course isn't a variation of CSCI 100 nor CSCI116, two 100 level courses offered by the computer science program.

## **5 Adjustments to other course offerings**

None. This course doesn't conflict with existing courses, so there is no need to make any adjustment to other courses. However, this course has potential to be adopted as an alternative to the current CSCI100. The courses can also be adopted by other courses to facilitate the teaching of those courses.

## **6 Suggested required texts or recommended materials**

- Computer Science: An Overview (11th Edition), by J. Glenn Brookshear, published by Prentice Hall 2011.
- Computer Science Illuminated by Nell B. Dale and John Lewis
- Discovering Computers: Concepts for a Digital World Web and XP Enhanced by Shelly, Cashman and Vermaat, Course Technology
- Fluency 4 with information technology: skills, concepts and capabilities, by Lawrence Snyder
- Concepts in Computing, by Kenneth Hoganson
- The Most Complex Machine: A Survey of Computers and Computing (Paperback), by David J. Eck

## **7 Additional library holdings and/or facilities needed to support the course**

No.

## **8 If specific computer use or special equipment is planned**

A course management system like Blackboard is needed. No other computing resources are anticipated.

## **9 List of instructors who will be teaching this course along with their specific qualifications to teach it.**

Since the course is a self-paced and at 100 level, we anticipate that any instructor with a master degree or Ph.D. degree in a computing field or any IT professionals with programming experience should be able to supervise the course. The workload of the conducting the course remains to be found out.