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By popular demand, here again in Fall 2006: **ENG SC726**

# Personal Knowledge Engineering

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This course introduces **Knowledge Engineering** on a **personal scale**: what concepts and tools individuals need in order to acquire, structure, and activate knowledge *for their own sake*—not just as operators of their employer's information-processing machinery—in research, business, personal life, authoring, presence on the Internet, etc. The course is aimed at (a) students who anticipate using the computer as a significant extension of themselves in their professional life without attempting to be full-time computer experts, and (b) students who want to teach others how to do so, find out what is possible and what is being done, and in any event explore this area of knowledge engineering and contribute to its development.

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Students will learn how to express knowledge-oriented tasks, processes, data structures, and documents in terms of essential features and goals, and instruct computers to translate this conceptual "deep structure" into a working-level "surface expression" appropriate to the desired use and the available resources. Specifically, how to create personal agents to extend one's reach in Web mining, task automation, information storage and retrieval, classification, inference.

The course will be evenly divided between *development of concepts* (history and objectives; appropriate aspects of computer science, cognitive science, and software engineering) and *learning by doing*. It will consist of lectures, hands-on experiments, software projects (eg, a Web crawler), discussion of seminal papers, and seminars by invited speakers.

Among the methodological issues to be treated:

- Adapting the design/fabricate/evaluate cycle (especially in knowledge processing projects) to casual prototyping, and making it accessible to the layman.
- A scripting language as a personal servant.
- Semantic tags (eg, XML) vs informal structuring.
- Markovian vs Bayesian methods in inference and search tasks.
- How to engineer a scientific document—text, formulas, figures, bibliography, indices.
- Databases for pedestrians.
- Social, technical, and economic demands for different types of computational literacy.

**Background** In the world of Information Technology, where hardware and to a certain extent software have become commoditized, the most exciting developments are now taking place in *knowledge contents* engineering, especially to address the insatiable needs of corporate industry and e-commerce.

However, most methods and instruments developed in that context, when at all accessible, are not well suited to the needs of the individual. The latter has different goals, more idiosyncratic interests, and more limited resources than a corporate organism, and accordingly must adopt different strategies and differently-fitted tools. For example, for computer-aided processing of personal knowledge, *lightweight prototyping* is a more appropriate engineering mode than *industrial-grade design*; learning by example and gradually adding recipes to one's own "cookbook" may be the personal counterpart to a research department.

Individual empowerment through a modest command of knowledge engineering cannot be achieved without some personal investment. As a counterpart, besides being a source of personal satisfaction, the competences thus acquired will tend to enhance one's effectivess in academic and corporate life.

**Intended audience** Students whose interests entail manipulating the *content* of information rather than just its physical *carrier*, either from the viewpoint of concept and tool development (computer science, computer engineering, information technology) or for the sake of applications (bioinformatics, manufacturing, experiment conduction and data analysis, Internet publishing mining and filtering, digital libraries, education, computer-assisted teaching, knowledge collection and dissemination).

**Format** Lectures, demos, seminars and discussions; take-home practice; team project.

**Prerequisites** Interest in designing, building, and making things happen—whether on a hardware, software, or organizational level. Exposure to using computers for a definite task. Some exposure to a scripting environment such as Command Prompt, Basic, UNIX Shell, Perl, or Python.

**Location and times**

PHO536 or as posted there, Tue Thu, 2:00–4:00pm.