

# Proposal: new course tags and MSc DPTs

Sharon Goldwater, 11 Feb 2019

## 1 Summary and goals of this proposal

In order to better manage MSc admissions and course sizes, in Sept BoS approved an outline proposal to better focus and differentiate the MSc degrees. The Sept proposal included wording for the MSc marketing materials (now in place) and a rough outline of what the new degree programme tables (DPTs) would look like, based on a re-designed set of 'tags'. This paper (with attachments):

- Proposes and justifies a slightly modified set of tags from the original proposal, after explaining how tags are used to create course collections in DPTs. This set aims to still be relatively small, while allowing us to
  - more cleanly and intuitively divide up the courses along lines that are relevant to the degrees (reducing overlap between tags), and
  - better control enrolment on the largest (ML) courses
- Provides details of the proposed new mapping of tags to courses (in attached spreadsheet).
- Uses these tags to define course collections and DPTs for MSc degrees in line with the new, more focused remit of each degree.
- Shows how to use the new tags to recreate course collections equivalent to those currently used for UG DPTs, so that course options available to UG students won't change.
- Proposes some very small bug fixes to UG DPTs that were discovered during this process.

### **Degrees affected (henceforth, 'traditional degrees'):**

- MSc degrees in AI, CS, Informatics, and Cognitive Science (substantive changes).
- UG degrees in CS, AI+CS, SE, SE w/ Management (mostly minor changes to DPT construction that don't change the permissible courses; some bug fixes).

### **Related proposals/documents:**

- On 16 Jan, BoS approved a proposal to convert Introduction to Java Programming (IJP) to a Level 11 course called Introduction to Practical Programming with Objects (IPPO).
- The New Course Proposal form has been updated. A new section has been added in order to prompt/help lecturers choose the correct tag for their course from the new tag options. The new form is now available on the BoS web page.

### **Consultation:**

- The technical aspects of the proposal have been checked with Tim Colles (who needs to update the possible tags in Theon) and Vicky MacTaggart (who needs to implement the new tags, course collections, and DPTs). Both said this proposal should be feasible to implement.

## 2 Focus of each MSc degree (already approved)

The updated focus for each of the 4 traditional degrees was approved in the earlier proposal. As a reminder, they are:

- Artificial Intelligence: as now, but with slightly stricter DPT.
- Cognitive Science: be clearer that there are two typical tracks: (1) speech and language processing in humans and machines, or (2) computational models of mind and brain.

- Computer Science: marketing focuses on “core” CS (i.e., foundations and systems). SE courses are also included as “core” options but not emphasized in marketing, to avoid false impressions of having a SE degree. This focus simply codifies the existing Specialist Areas for CS more into the marketing and DPT.
- Informatics: require courses in the wider scope of Informatics, i.e., those outside of core AI that deal with information processing in natural systems (biological or social).

### 3 Background: tags and course collections

We currently use a set of 4 course tags (AI, CS, CG, SE) for our Level 9-11 courses. Tags are displayed in the [sortable course list](#), and ITO use the tags and year information from that list to construct the “course collections” that are used to build the DPTs for the traditional degrees.

For example, the third year of the BSc in AI allows students to choose 30-50 credits from the collection **Informatics Hons 3<sup>rd</sup> year AI courses** (built by selecting all year 3 courses tagged as AI) and 0-20 credits from the collection **Informatics Hons 3<sup>rd</sup> year non-AI courses** (built by selecting all year 3 courses tagged as CG, CS, or SE; then removing any tagged as AI).

Similarly, there are course collections for most possible combinations of {3<sup>rd</sup> year, 4<sup>th</sup> year, MSc} and {X, non-X} (where X is one of the four tags), plus a few additional collections, for a total of 23 collections used in the traditional degrees.

This system has become less useful and more error-prone over time, for several reasons:

- Many staff proposing courses have no idea how the choice of tag affects DPTs, or what tags are even for. So new courses often end up with missing or inappropriate tags, ending up in the wrong course collection or even in no course collection at all.
- On the other hand, we now have a much larger set of courses that correctly have no tag (e.g., CDT-only courses), so simply checking for untagged courses doesn’t work.
- At present, there is a huge overlap between some tags (notably, CG and AI), making these distinctions almost pointless.
- Our course collections are large, which makes them difficult to maintain (errors are hard to spot) and difficult to navigate for students and PTs. This is particularly true of the ‘non-X’ collections, which need have no intellectual coherence. (See further discussion in 5.1 below.)

We address these issues to some extent with the new course tags and collections, specifically by reducing the overlap between tags and the number of large collections (by one), and by adding a prompt and guidance for choosing tags to the New Course Proposal form (already done).

### 4 Proposed new tags

The earlier proposal listed five tags; I now propose six, to cover both UG and MSc degrees (the SE tag wasn’t needed before because only MSc degrees were considered). The new tags are listed below and a proposed mapping of courses to tags can be found in the attached spreadsheet.

#### 4.1 Proposed tags and justification

The proposed tags are:

- **FSS:** computer science foundations, systems, and software [*Core for CS degrees*]
- **SE:** software engineering and closely related courses. [*Core for UG SE degrees; not relevant for MSc*]

- **ML:** machine learning foundations and methods [*Core for AI degrees; also important for CS and other degrees, but these will have fewer allowed credits of these courses*]
- **AIA:** artificial intelligence applications and paradigms [*Core for AI degrees, also relevant for Cognitive Science degrees*]
- **NS:** natural (social and biological) systems. [*Core for Informatics MSc*]
- **COG:** cognitive science and neuroinformatics. [*Core for Cognitive Science degrees*]

Four of the tags (**FSS, NS, COG, SE**) form the cores of the corresponding MSc and/or UG degrees.

The **ML** tag is pragmatically critical and academically sensible. Currently, ML courses are tagged both 'CS' and 'AI', and indeed it make sense for a degree focusing on 'core' CS to include some ML options. However, these courses face huge enrolment pressures, so we need to be able to limit the number of ML credits available to non-AI students. In future we may also want to ensure that AI degree students take some non core-ML, so they are exposed to applications or other approaches. This is currently suggested in the handbook but not enforced in the current or proposed DPTs. Depending on how the next AY turns out, we could consider requiring AI students to take some non-ML courses.

The **AIA** tag is used for the remaining core AI courses, i.e., applications and non-ML paradigms.

## 4.2 Courses without tags

Tags are used to create collections of optional courses. So, with specific exceptions (see below), all Level 9-11 courses with Informatics course codes must be assigned at least one tag.

Courses that should remain tag-less are:

- Courses for distance learning students
- Courses that are compulsory for all single-honours UG degrees (PI, ILP, SDP)
- IRR, IPP, thesis/dissertation courses (currently 10 of the latter)
- Courses open to CDT students only (currently PERP, IRDS)
- CDI2, which can only be taken by 2<sup>nd</sup> year Advanced Design Informatics students.
- The three basic MSc programming courses: Programming Skills, IPPO (formerly IJP), and Computer Programming for Speech and Language Processing (not an INFR code anyway). These will now have their own collection in the DPTs.
- EPCC courses. We may want to add them to the 'FSS' tag at some point, but would need to discuss with EPCC first.

## 4.3 Properties of the mapping

- All tagged courses must be at least one of: ML, AIA, FSS, COG
- SE is subset of FSS. (Note that SE is only relevant for UG DPTs.)
- NS is an 'add-on': all NS courses are also something else.
- ML (7 courses) is disjoint from all other tags.
- Overlap between remaining tags is kept to a minimum:
  - FSS/COG overlap for HCI (5 courses)
  - FSS/AIA overlap for graphics, TTDS, and some theoretical courses (8 courses).
  - COG/AIA overlap for NLP (6 courses). COG contains courses related to human cognition/neuroscience, HCI, and NLP, but no longer contains other AI/ML courses. NLP courses are still included because this is one of the advertised threads in the CogSci degree (and these courses discuss human language/linguistics).

For comparison, in the current tags AI/CG have 36 courses in common, and AI/CS have 21 in common.

## 5 Updates to DPTs and course collections

The proposed DPTs are built from course collections that are defined using the tags above. Two documents are attached with the details:

- CourseCollectionsProposed, a spreadsheet with the old and new definitions of each course collection.
- DPT\_updates, a document with the proposed new MSc DPTs and very minor changes (mainly bug fixes) to four UG DPTs. Some example course choices for MSc are also included.

For the **undergraduate** course collections, the contents of each collection don't change, but the tags used to define them do. I also propose removing some collections that can be replaced with existing ones in a way that leads to an equivalent set of course choices for students (see discussion below).

For the **MSc** course collections, some existing collections are updated using the new tags, some are removed, and some new ones are added.

In summary, of the 23 large course collections defined using tags, this proposal removes 4, adds 3 new ones, and renames 6 to better reflect their contents. (Renaming can be done easily, does not require deleting/adding anew.)

### 5.1 Discussion of course collection/DPT structure

This section justifies the proposal to remove or rename some of the course collections, specifically several "non-X" course collections (e.g., "Year 3 non-CS Courses").

Currently, most of our DPTs have one of two types of structure:

**Type A: Disjoint options.** Most of our single honours and MSc degrees are defined this way. For example, year 4 of the BSc in Computer Science requires

- 60-80 credits from the "CS" collection.
- 0-20 credits from the "non-CS" collection (a disjoint set).

**Type B: Overlapping options.** Several of our joint honours degrees are defined this way. For example, year 4 of the BSc in AI and Computer Science requires

- 30-50 credits from the "CS" collection.
- 30-50 credits from the "AI" collection (which overlaps).

(In practice, PATH does not permit students to choose the same course from both collections.)

Converting from type A to B is usually straightforward using existing course collections and with no effect on permissible options. For example, year 4 of the CS BSc could equivalently be:

- 60-80 credits from the "CS" collection.
- 0-20 credits from the "AI" collection (which contains all "non-CS" plus a few "CS").

**Tradeoffs.** The main benefit of Type A is that when students are choosing, fewer total courses are displayed and there is no need to decide which collection to choose a course from (since any course will only appear in one collection). If the course collections have very large overlap (as many of ours

currently do), then seeing most of the same courses appear in multiple collections probably makes course choice harder to navigate for students (and perhaps for PTs).

However, Type A DPTs require "non-X" (negatively defined) course collections, which have cons:

- They may not have any intellectual coherence, and even when they do, the title of the collection is not descriptive of that.
- Some "non-X" collections are very large, and might be easier to navigate by splitting into multiple positively defined collections.
- "non-X" collections are typically only used for a single degree and are often more difficult for ITO to create and check, potentially leading to more errors.

**Conclusion.** There isn't necessarily a single best option. The proposed updates to DPTs, like our current ones, use a mixture of Type A and Type B, but lean more towards Type B than at present, so that several of the "non-X" collections can be removed entirely.

## 5.2 [A note about compulsory courses in optional collections](#)

In recent years, there has been an effort to avoid including compulsory courses in optional collections. For example, when Computer Security became compulsory in UG3 of CS degrees, it was removed from the "Year 3 CS courses" collection of course options (in line with the Type A DPT above). However, this created problems for several joint degrees that use the CS option collection but where Computer Security is not compulsory. The current workaround is that CSec is included as an option in these degrees by having its own course collection.

While working on this proposal, I have concluded that removing compulsory courses from optional collections is not necessary. We previously worried that having the same course in both places would create confusion. However, nearly all students now use PATH for course choices and it turns out that PATH doesn't even show the course in the optional collection if it is already compulsory.

Ultimately, taking advantage of this fact could simplify many of our UG DPTs, but since there are already many changes to implement, I have not attempted to do so here. This should probably be revisited in future.