Course Proposals in progress

The following is a list of course proposals currently under development for possible delivery in 2022/23. BoS members are encouraged to contact the relevant member of staff if you have questions, comments, or suggestions.

We expect to see full proposals for consideration at the second (final) BoS meeting of S1.

Advanced Networked Systems (Level 11, to replace CN)

From Michio Honda (following discussion with Marina)

Level/year: UG4-MSc
Credits: 10

Audience: those who took COMN for basic computer networks (mandatory) and Operating Systems for basic computer systems (recommended).

Why needed: COMN teaches basics about computer networking, but state-of-the art or modern systems that support our life today are not covered.

Description:
This course will learn the following:
- Requirements and challenges to build and operate systems software and networking infrastru cture at a data centre scale.
- Protocol design and resource allocation challenges in the modern Internet, and state-of-the-art Internet technologies.

The course will be heavily practical and interactive, including paper reading and hands-on projects (e.g., reproduce existing research results)

Comments so far from DDoLT(curric):

Computer networking has not run since 2017/18. At that time it had 34 students, but the landscape of courses and numbers on degrees have changed a lot since then. I've asked Michio to run a very brief survey of last year's COMN students to gauge interest.

UG3 students can typically only take either COMN or OS, so if COMN is required, then OS can be at most a recommended co-requisite.

Foundations of Cognitive Modelling (Level 11, to replace TCM+IRR for MSc CogSci students)

From Frank Mollica (following discussion with Goldwater, Lucas)

Open to year 4 and MSc, 20 credits.

Proposed as a new compulsory course for students on the MSc Cognitive Science, also available to some PPLS MSc students and to UG4/5 students who have passed CCS, but not to other Informatics MSc students (who do IRR).

While IRR teaches valuable skills, this course would leverage the time spent in IRR to learn those skills on content specialized for Cognitive Science, ensuring that our graduates leave with cursory understanding of several subfields of cognitive science in addition to the skills in IRR and the advanced depth of knowledge they receive in the rest of the specialized courses on the DPT. In addition, they would recieive more instruction and practice reading current articles, critically assessing the theoretical adequacy of a given model, comparing strengths and weaknesses of different modelling approaches and doing science communication, which are core graduate attributes of the programs (or should be in the case of the MSc).

The idea is to combine IRR and the dead Topics in Cognitive Modelling course to be a specialized core course for the CogSci MSc. The course would run the full year. Following IRR, the first semester would begin with lectures on how to do a research review and how to do science communication (emphasis on oral presentation skills) followed by student/group paper presentations and discussions on foundational topics in cognitive science. Following TCM, the second semester would start off with lectures on computational modelling approaches, model evaluation and necessary background, followed by student/group paper presentations and discussions on cognitive models synthesizing and evaluating information from several papers. Throughout the year, there will be summative brief weekly paper responses (20%). In the first semester, there will be a formative critique paper and a summative research review (40%). In the second semester, there will be a summative oral presentation (40%). The hope is that enrolment allows each student/group to present twice so that the first presentation will be formatively assessed.

Comments so far from DDoLT(curric):

Note that TCM was a moderately popular course, but has not run since 15/16 due to staffing issues.

This idea has been discussed with DDoLT(curric) and DDoLT, in the context of work that Frank M is just starting: there is a working group to review and re-vamp the MSc Cognitive Science to make the degree more coherent and attractive, and improve student experience.

DDoLT has tentatively agreed to the format of a relatively small course with a quota (~40, but TBD), to achieve a cohort effect -- similar to the SPT course that Cybersecurity MSc students do. We expect around 30 students/year from the MSc CogSci (20-25) plus CogSci and other UG students, and Frank reports that several PPLS MSc Programme Coordinators said they would be interested in having the course available to their students, so getting to 40 seems very doable.

Some of the support needed to deliver the course can be reassigned from IRR. Frank has also be en asked to discuss possible co-teaching arrangements with PPLS staff (for which a cost-sharing agreement would be put in place). This would make the course more robust to staffing issues on our side – it will be a lot easier to find 10pts of effort than a full 20pts.

Computational Neuroscience (Level 11, to replace NC and NIP)

From Matthias Hennig (following discussion with Series, Chadwick)

Peggy, Angus and I discussed neuro/cog-sci teaching done by ANC, and we think it makes sense to propose to offer one additional level 11 course in this area.

Currently NC and NIP are both suspended, and only CCN runs in semester 2, taught by Angus and Peggy this session.

The idea is to offer a blend of NC and NIP in semester 1, which would replace both of these course s.

Angus suggested to give it a new name, "Computational Neuroscience" (CN or CNS?). This makes much sense as NC and NIP both contain material that is now a little historic, and a new CNS course combines the most relevant material. So it is not a complete renewal, but more like an update of the NC curriculum, and I would rather propose it as a change to NC.

CCN in semester two could then have this new course as a recommended prerequisite.

Target groups would be CogSci students and also AI students with an interest in neuro topics.

It should be possible to make it less mathematically demanding [than NC]. I think the course has, over the years, accumulated some materials that could be dropped.

Comments so far from DDoLT(curric):

I believe this would be 10pts, but need to confirm.

Seems to fit with plans so far for re-vamping MSc Cognitive Science, need to ensure appropriate mathematical level.

Elements of Programming Languages

James Cheney has indicated that he plans to revive this 10pt Level 10/UG3 course for next year. It hasn't run in several years due to his fellowship, but was popular when it did run and we otherwise have no programming languages courses running right now.

Some updates are needed to the course due to the changes to our pre-hons curriculum since it last ran. James will bring these to BoS in the spring.

Computational Methods for Sustainability

Tentative, from Nigel Goddard

Following discussion at the School level about our contributions to sustainability, Nigel asked if there would be interest in reviving a course on this topic:

> *About 15 years ago I initiated and taught an MSc course called "Computational Methods for Global Change Research". It was a broad course looking at modelling methods used in climate research, biodiversity research and economic research. I'm also very interested in the application of systems thinking to sustainability, and I think there could be a great opportunity to offer courses in systems thinking for sustainability that use computational methods to educate about taking systems views of complex problems.*

Comments so far from DDoLT(curric):

DDoLT and DDoLT(curric) discussed this and and agree the topic is important for the school. We asked whether Nigel would consider a more ambitious approach than a 10pt lecture/exam course, instead considering a more experiential/project-based course, with limited enrolment to ensure proper support, perhaps even with an application process (similar to what we do now for Computing in the Classroom). It would be good to consider some or all of the following aspects:

- Students work in groups

- Include students from and/or co-teaching with another school (say, Geosciences?), esp if working in groups
- Work on projects for external groups or stakeholders

Done well, this could become a flagship course. But developing that may take some time.

It is unlikely that a full proposal will be ready for BoS this semester, but we hope that a preliminary proposal may be, including a timeline for development. BoS members with an interest in this area are encouraged to contact Nigel.