

IPAB Teaching Plans

Summary: Based on a review of teaching provision in IPAB topics we propose the following for consideration and feedback from the BoS:

1. A new 10pt level 11 course ‘Image and Vision Computing’ (IVC) introducing key practical and theoretical concepts in computer vision and graphics (see draft proposal)
2. A corresponding revision of content in level 11 20 point course Robotics: Science and Systems (R:SS), to no longer cover the computer vision topics except where directly relevant to robotics. Instead, the remaining part will strengthen the coverage of the essential topics of robot control, and robot perception & mapping.
3. Expanding Robot Learning and Sensorimotor Control (RLSC) to a 20 point course (see draft proposal).
4. A reduction of the assessed coursework in level 9 course Introduction to Vision and Robotics (IVR), and change of Intelligent Autonomous Robotics to level 11.

Background:

MSc provision: R:SS (level 11) has been developed as a core course for the robotics specialism in the Informatics MSc and for the RAS CDT. It was originally devised to replace the requirement that these students take IVR (level 9) and Intelligent Autonomous Robotics (level 10) and has been very successful in better meeting the needs of MSc students. But as a consequence, R:SS currently attempts to cover basic vision concepts (from IVR) as well. MSc students wishing to do Advanced Vision (but possibly with no special interest robotics) needed to take this 20 point course with demanding coursework (building a robot). At the same time, some core topics that an MSc in robotics should cover are not adequately addressed. We believe the best solution is to split the vision topics into a separate course ‘Image and Vision Computing’ (IVC), and revise R:SS to be more clearly focussed on robotics alone. This has the additional advantage of allowing better coverage of core topics in IVC to provide more space for tackling advanced topics in Advanced Vision, Computer Graphics and Computer Animation and Visualisation.

Given new IPAB staff members, new robotics facilities in IPAB, and to bring the course up to date we suggest Robot Learning and Sensorimotor Control be expanded to a 20 point course (see attached). In the longer term (not before 2018/19 session) a similar expansion of Advanced Vision to 20 points is under consideration, and a new course in virtual/augmented reality.

UG provision: IVR is a 10 point 3rd year course, and to align with recent recommendations, we should reduce the number of assignments. A suggestion is to remove the ‘robot kit’ based assignment, recognising that 3rd year Informatics students get the opportunity to work on a real robot implementation in SDP.

We note that currently, the existence of a separate UG-only fourth year course in robotics (IAR, 10 points) has been advantageous in both handling workload and in student satisfaction. However, as IVR+IAR diverge in content from R:SS, we also propose that the current prohibition of this combination for UG is relaxed, though we would recommend that normally only year 5 MInf students be advised to attempt R:SS. We also note that IAR is currently an anomaly as the only

level 10 year 4 course (other than honours project) on the books. It could be changed to level 11, and this would also allow MSc students outside the robotics specialism, but interested to learn something about robotics, to take the course.

Current IPAB associated courses: (level/year:credits) – numbers enrolled in 2016/2017

Semester 1	Semester 2
Introduction to Vision and Robotics (9/3:10) - 88	System Design Project (9/3:20) - 144
Intelligent Autonomous Robotics (10/4:10) - 20	
	Advanced Vision (11/4:10) - 59
Computer Graphics (11/4:10) -40	Computer Animation and Visualisation* (11/4:10)
Robotics: Science & Systems (11/5:20) - 39	Robot Learning & Sensorimotor Control (11/5:10) - 23
<i>Image and Vision Computing (new) (11/5:10)</i>	Decision Making in Robotics (11/5:10)*
	Reinforcement Learning (11/5:10) - 125

*Not taught in 2016/17 but expect to be taught in future

** Note also Natural Computing (10/4:10) could be revived if teaching resource allowed

Example routes for students

UG: year 3 IVR + SDP; year 4 IAR and/or AV; or CG + CAV

MSc: IVC + AV; RSS + RLSC; IVC + CG + CAV; RSS + DMR; RL + DMR

Current IPAB teaching assignments in Theon for 2016/17

MF - 10 points IVR* (= full load as CF)

TK - 10 points CG (= full load given secondment)

Ram - 10 points of RL (= full load given sabbatical)

BF - 10 points of AV + 5 points of R:SS

BW - 8 points of SDP and 5(10) points of IAR

MH - 10 points of Inf2D + 5 points of R:SS

SV - 5 points of R:SS and 10 points of RLSC

ZL – 5 points of R:SS (first year in post)

MM - (5) points of IAR and 4 points of SDP

TH - 10 points Inf1- OOP

KS – fellowship (has offered to teach 5 points in 2017/18)

VF – fellowship and secondment

An additional post in Image and Vision Computing is currently advertised, closing January 2017.

*Theon has each of IVR and AV with extra 10 points for distance learning version.