THE UNIVERSITY *of* EDINBURGH
College of Science & Engineering

Proposal for New Degree Programmes

Stage 2

Contents

THE UNIVERSITY OF EDINBURGH

PROGRAMME SPECIFICATION FOR [*INSERT NAME OF PROGRAMME OF STUDY, e.g.* M.A. Honours in Ancient History *or* M.Sc. in Public Health][1]

PROGRAMME SPECIFICATION

OVERVIEW

Awarding Institution	University of Edinburgh
Teaching Institution	University of Edinburgh
Programme accredited by	n/a
Final Award	PhD
Programme Title	PhD in Data Science and Artificial Intelligence
UCAS Code	n/a
Relevant QAA Subject Benchmarking Group(s)	**n/a**
Postholder with overall responsibility for QA	Director of QA
Date of Production/revision	02/12/2018

EXTERNAL SUMMARY

Data science is ubiquitous, and UK corporate competitiveness depends on it. **Data science** (DS) is the study of the computational principles, methods and systems for extracting knowledge from data. Almost every activity in science, society and commerce now relies on data-driven decision making — from large data analytics in biology to small companies deploying data-collecting apps to millions of customers. We have also recently seen an explosive growth in the capability of modern artificial intelligence technologies. **Artificial intelligence** (AI) is the study of computational

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systems that demonstrate capabilities of perception, reasoning, learning and action that are typical of human intelligence. The great recent successes of modern AI, such as object recognition and game playing, are based on data-driven approaches rooted in machine learning and deep networks. It is no coincidence that these fast-emerging trends are happening simultaneously; **data science and AI are synergistic**. Both areas share underlying statistical and mathematical foundations. Furthermore, data science applications are high demand use-cases for AI, where AI automates the more human-intensive parts of the data science pipeline. Hence there is a need for students with cross-cutting expertise in data science and modern AI. This requires **integrated training and research in data science and artificial intelligence**.

The **vision of the PhD in Data Science and Artificial Intelligence** is to train students who will have crosscutting capability in data science and AI. CDT students will become expert at solving key AI challenges vital for the data science endeavour, and on identifying the valuable data science problems that can be tackled as a result. Through a unified mastery of data science and AI, our CDT graduates will be capable of being the driving force of the data driven future of the UK economy.

EDUCATIONAL AIMS OF THE PROGRAMME

Each student will undertake a four-year training programme leading to a PhD. We have designed the programme to emphasise not only depth in a specialist area, but also the breadth across disciplines that is necessary to work in and lead interdisciplinary teams. To successfully train this cohort, every CDT student will need to graduate with:

• In-depth technical knowledge and proven research capability jointly in data science and AI;

• Knowledge of which technologies must be integrated in deploying AI solutions for data science;

• Experience of the wide applications of these technologies in commercial and research settings;

• Ability to be inventive in developing appropriate AI methods for new settings;

• Deep understanding of the ethical, societal and international issues around data science and AI;

• Skills in communicating to technical and nontechnical audiences, and active involvement in knowledge transfer and public engagement;

• Organisation and leadership skills and experience.

PROGRAMME OUTCOMES

Knowledge and Understanding	Knowledge of the cutting edge in data science and AI, and research ability in this area.
Graduate Attributes: Skills and abilities in Research and Enquiry	Graduates from this course will:
	- be able to select and develop appropriate AI methods and Data Science methods for particular problems;
	- be able to evaluate the societal implications of AI research;
	- be able to understand and explain state-of-the-art AI research;
	- understand and develop on the key challenges across data science and AI.
Graduate Attributes: Skills and abilities in Personal and Intellectual Autonomy	Graduates from the course will:

	- be able to set and research key AI and data science challenges;
	- be able to independently develop and implement AI methodologies and deploy them in a range of settings;
	- be able to identify key methods across data science and AI that are vital for solving real-world AI problems.
Graduate Attributes: Skills and abilities in Communication	Graduates from the programme will:
	- be able to communicate orally their research to an interdisciplinary audience through presentations;
	- be able to summarise their research in a scholarly way through project reports;
	- be able to work effectively as part of a team;
Graduate Attributes: Skills and abilities in Personal Effectiveness	Graduates will have proven ability to:
	- acquire knowledge from a variety of sources, including the research literature, peer interaction, online materials, conferences;
	- work effectively and independently on large projects, both individually and as part of a team
	- initiate and sustain collaborations with other scientists and with companies.
Technical/practical skills	Graduates of the programme will be able to:
	- implement and test novel models that combine AI and data science methods and problem domains.
	- code scientifically in relevant languages including modern AI frameworks;
	- develop, use and integrate data sets for their work.

PROGRAMME STRUCTURE AND FEATURES

The programme is structured according to the normal University PhD training, with yearly review meetings involving the supervisors and an external board member.

Mode of study: full time

Language of study: English

TEACHING AND LEARNING METHODS AND STRATEGIES

This section should include the following:

- *The range of teaching and learning methods used on the programme, by year of programme (including opportunities for feedback)*
- *Facilities (e.g. library; IT or any other distinctive facilities provided within the School)*

TEACHING AND LEARNING WORKLOAD

Please indicate the typical workload for a student on this programme for each year of study

Start Year	Time in scheduled teaching (%)	Time in independent study (%)	Time on placement (%)
Year 1	*10*	*90*	*0*
Year 2	5	95	0
Year 3	0	100	0
			Add rows as necessary

ASSESSMENT METHODS AND STRATEGIES

The final PhD will be assessed through a viva involving both external and internal examiners, as per standard University procedures.

ASSESSMENT METHOD BALANCE

Please indicate the typical assessment methods for a student on this programme for each year of study. Additionally please complete the Assessment matrix.

N/A			

CAREER OPPORTUNITIES

The career opportunities in this area are huge and varied, and change year-on-year. Career information is provided to students as part of the programme. Existing graduates in this field have gone on to become CEO of high-valuation startup companies, chief data-scientists and data-scientist in many different companies, academics, AI researchers in corporate labs, etc.

OTHER ITEMS

None

ABOUT THE PROGRAMME

ADDITIONAL REQUIREMENTS

PRSB Accreditations (where relevant)	*Please note accreditations awarded or planned*
Admissions requirements **Before completing this section please contact a member of the Recruitment and Admissions team for further guidance.**	Students will have passed a bachelors or higher degree in a relevant subjects and have shown evidence of the required mathematical and computational capability, and research experience, necessary for evidencing their potential capability for research in data science and AI.
To be completed by R & A Team	*Please select to confirm that a member of the R & A section have consulted on the Admissions requirements.* ☒
Work experience/work based learning opportunities	There are ~40 companies associated with this programme. These companies and more are looking for students to do internships.

CONSULTATION

Student body	This PhD programme was prepared during the design of a CDT programme, and hence we engaged in extensive consultation with current students.

External Review/Critical Friend	We consulted the external partners and the advisory board of the current CDT in Data Science

ADDITIONAL DOCUMENTS	
Memorandum of Agreement (if applicable)	n/a
Award letter (if applicable)	n/a
DPT (please use your current template)	n/a

APPROVAL

Programme Title:	PhD in Data Science and Artificial Intelligence
Programme Proposer:	Amos Storkey

STAGE 1: SCHOOL BOARD OF STUDIES REVIEW AND APPROVAL

Confirmation of approval of the proposal at the School Board of Studies should be entered below.

Date of BoS: 5 December 2018

Convener Name:

Comment and Approval (BoS Minute):

Please provide either a link to the minutes of the Board or a copy of the relevant text from the minutes.

STAGE 2: HEAD OF SCHOOL REVIEW AND APPROVAL

Head of School: Jane Hillston

Please print name

Comment and Approval:

Signature:

STAGE 3: COLLEGE CURRICULUM APPROVAL BOARD REVIEW AND OUTCOME

Date of CCAB:

Convener Name:

Stage 2 Outcome (please select as appropriate)

Proposal approved ➡ Proceed to *New Programme Request & DPT creation*	☐

Proposal approved with conditions	☐
Proposal rejected with recommendations	☐
Proposal rejected	☐
Comment:	

DOCUMENT CHECKLIST	
Document	**Completed**
DPT	☐
Memorandum of Agreement (if applicable)	☐
Assessment Matrix	☐
Award letter (if applicable)	☐