THE UNIVERSITY of EDINBURGH
College of Science & Engineering

Proposal for New Degree Programme

Stage 1

Contents

OVERVIEW OF PROGRAMME

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ABOUT THE PROGRAMME		
Title of programme	MSc in High Performance Computing / High Performance Computing with Data Science (Online Learning)	
Intended Award	MSc / PGDip / PGCert	
Alternative awards	PPD	
School	Informatics (EPCC)	
Programme Director	Dr David Henty	
Programme start dates	September 2020 (January start dates also possible for PPD).	
SCQF level of highest award	11	
Total credit value of programme ***(for highest award)***	180	
Partner institution(s) if any		
Mode of delivery ***(Please ✓ those which apply to this programme)***	On campus	
	Online	✓
	Blended learning	
	FT	

	PT	✓
	Intermittent	✓
Expected length of programme	FT	
	PT	
	Intermittent	✓

Description of the programme and its structure (maximum 150 words)

N.B.: These programmes are online versions of EPCC's two existing on-campus MSc programmes, with which they will share names with "(Online Learning) (ICL)" after in all publicity and administrative material except.

MSc in High Performance Computing

This programme aims to provide students with in-demand (for both a wide range of industries and academic disciplines) skills and knowledge of the techniques and technologies underpinning parallelism and High Performance Computing (HPC). HPC is the use of powerful processors, networks and parallel supercomputers to tackle problems that are very computationally or data-intensive.

The flexible structure ensures students acquire core principles required before proceeding to their choice of more advanced topics and allows students to take on the programme at their own pace.

EPCC is the UK's leading supercomputing centre with staff who are experienced HPC practitioners and is a major provider of HPC training in Europe with an international reputation for excellence in HPC education and research and a well-established on-campus MSc programme that has been successful in training generations of specialists in parallel programming. Students benefit from access to UK national HPC facilities such as the National Tier 1 service, currently ARCHER, and Tier 2 service, Cirrus.

MSc in High Performance Computing with Data Science

This programme aims to provide students with in-demand (for both a wide range of industries and academic disciplines) skills and knowledge of the techniques and technologies underpinning High Performance Computing (HPC) and Data Science. Data Science involves the manipulation, processing and analysis of data to extract knowledge, and High Performance Computing (HPC) provides the power that underpins it.

The flexible structure ensures students acquire core principles required before proceeding to their choice of more advanced topics and allows students to take on the programme at their own pace with the taught component possible to complete over between two and five years.

EPCC is the UK's leading supercomputing centre with staff who are experienced HPC practitioners and is a major provider of HPC training in Europe with an international reputation for excellence in HPC education and research and a well-established on-campus MSc programme that has been successful in training generations of specialists in parallel programming. Students benefit from access to UK national HPC facilities such as the National Tier 1 service, currently ARCHER, and Tier 2 service, Cirrus.

Career, employability and opportunities for continuing professional development.

Graduates from EPCC's on-campus MSc programmes are in high demand from a wide range of companies ranging from multinationals to SMEs both within the UK, Europe, and internationally as well as a strong demand from within academia both as researchers within HPC, computational science fields, data science, and professionally for HPC services and centres underpinning research. Recent destinations include: ARM, Intel, Amazon, MathWorks, NCR, Avaloq, Global Surface Intelligence, Boston Ltd, ECMWF, Leonardo, STFC, ICHEC, EPCC itself and PhD opportunities (including 8 current UoE PhD candidates).

The online versions of the MSc programmes are targeted at audiences unable to attend a full-time and/or on campus MSc, thus it is anticipated to be a career development opportunity for those working in the field: such as the research software engineer community, computational scientists, or for those attempting to retain to access those areas.

EPCC regularly receives e-mails from employers asking for job vacancies to be passed to our MSc graduates at a rate which far outstrips the number of MSc students on the course, demonstrating a demand for students with these skills and the regard in which the existing on-campus programmes are held. As we are approaching maximum capacity for the on-campus programmes an online programme is the only way in which this demand can be met further.

BUSINESS CASE

This section should be used to outline the business case for the proposed programme. Before completing this section market research should have been undertaken.

	STRATEGIC PLANNING, RECRUITMENT & COMPETITOR ANALYSIS	
Programme Title		MSc in High Performance Computing and MSc in High Performance Computing with Data Science
Programme Proposer		Dr David Henty and Mr Ben Morse
Strategic Planning	•	• Increasing online teaching activity is a strategic objective for EPCC, both in a formal MSc context and to make material ready for the online sphere for national training services. This also fits into College's support for the Data Science, technology and Innovation programme and all but one taught course attached to EPCC's online MSc Programmes are already planned to be offered on the DSTI DPT as well, enriching that programme and adding a possibility for an HPC specialism within DSTI as well. • All EPCC teaching activity contributed towards DDI training targets. • This programme is expected to enrich and complement EPCC's existing on-campus programmes as it will enable additional staff members to be involved in teaching, both improving resiliency within EPCC and providing more input for continual review and development of material for both online and on-campus MSc teaching and national training.
Recruitment *Please provide a detailed commentary on your marketing and recruitment strategy.*		*Please consider the following:* • *What demand is there for graduates with this qualification?* ○ EPCC has received 40 enquiries about online versions of its existing on-campus MSc programmes in the past two years. While some enquirers have joined the DSTI programme, others have specifically stated a desire to access the MSc programmes in HPC/HPC with Data Science, but an inability to attend on-campus in Edinburgh. ○ EPCC's existing contacts in the academic and RSE spheres as well as employers in the HPC sector and beyond locally, nationally, and internationally have identified this material as important, but inaccessible on-campus for many colleagues within the UK. ○ EPCC has recruited multiple members of staff from its on-campus MSc programmes. • *What is the School's recruitment and marketing strategy for this programme?* ○ Marketing activity will be undertaken in parallel with marketing and recruitment for the on-campus programmes and collaboratively/in a complementary fashion with DSTI as part of the College's online learning offering. ○ Utilisation of existing networks (RSE, academics, MSc graduates, industrial contacts). ○ Region-specific marketing with Edinburgh Global support.

		○ Like our on-campus programmes recruitment and marketing will focus on EPCC's vast experience in the field of HPC and national and international reputation for training in the area. The programmes, like their on-campus equivalents, will retain their practical focus in structure and delivery to retain EPCC's strengths in practical and experiential learning. EPCC's strong links to industry for industrial dissertation projects and guest lectures enabling access to industry (including hosting two members of Nvidia staff, Cray personnel, etc.) will also be leveraged. ○ For the MSc in HPC with Data Science the programme will also harness EPCC's unique position at the intersection between HPC and Data Science and the myriad possibilities afforded by EPCC's place and central role in creating the World-Class Data Infrastructure central to the City Region Deal. • *Who is the target market and how will the programme be marketed to them?* ○ The target market for these programmes occupies, arguably, an even broader field than the on-campus programmes. A key factor in offering this material online is to open the material up to those who are unable to attend an on-campus programme in Edinburgh either due to work (e.g. academics, RSEs, or employees wanting access to such material for professional development based), or economic factors (e.g. Edinburgh cost of living/tuition fee levels for full-time international students) • *Will any existing programmes be affected (negatively or positively) by the introduction of this programme?* • *If so, which programmes and how will they be affected?* ○ EPCC's on campus programmes MSc in High Performance Computing and High Performance Computing with Data Science ▪ Primarily EPCC sees the programmes as appealing to different audiences: those (e.g. new graduates) wanting to complete an MSc in the field in less-than 3 years should either attend the one-year full-time (or two-year part time) on-campus option(s). The slightly higher absolute fee level of the online programme compared to the part-time on-campus programmes should encourage the small number of students who apply to the on-campus programme to undertake that, although the increased flexibility of the intermittent programme may make that more attractive. ▪ Synergy and increased efficiency and resiliency are anticipated by adding the online programmes to the existing EPCC MSc teaching and national training environments. ▪ The online MSc programmes are anticipated to also increase EPCC's links to industry and ability to offer industrial dissertation projects to companies for whole the summer months are unsuitable to work with a student. ○ Data Science, Technology and Innovation ▪ There is the potential for this programme to siphon some students from DSTI due to that programme's broad base, however it will be subject to more specific admissions requirements especially around programming, leaving DSTI as the more accessible entry-route. Any impact is considered minor and reflects a population of students whose entry

		to DSTI is generally as a result of existing EPCC courses within that programme and direction to it from EPCC as the only way to access EPCC MSc material online at present. ▪ All marketing activity for these programmes will also direct to DSTI programmes, thus potentially more than offsetting any DSTI losses through increased indirect publicity. ▪ Through introduction of this programme and the courses attached to it into the College's online ecosystem, DSTI benefits from an increased curriculum offering and the potential to launch a new DST specialism in HPC, which may be attractive to students who do not meet the programming requirements for the MSc in HPC/HPC with Data Science programme, but wish to acquire some of the core skills. ▪ The Programme Director of DSTI, Dr Adam Carter, supports the creation of these programmes and discussions have been held with the DSTI team about mutual support and opportunities to work together cooperatively as both sets of programmes will be run from the Bayes Centre. • *What type of career could someone with this qualification be suited for?* ○ A very broad range, from the areas of computational science, academic research, software development, fintech and banking/finance, industry, HPC-specific areas. Initial graduate destinations for on-campus students over recent years include: ARM, Intel, Amazon, MathWorks, NCR, Avaloq, Global Surface Intelligence, Boston Ltd, ECMWF, Leonardo, STFC, ICHEC, and, EPCC itself. Many students also go on to further study opportunities with 8 current PhD students at the University of Edinburgh being graduates of the programme.
Competitor Analysis *A competitor analysis report provides a better understanding of the marketplace and competition, from the going rate for tuition fees to the unique selling points and marketing strategies of competitor programmes.*	•	• At present no competitor offers an MSc with an HPC specialism online, although some may be close to doing so. Therefore this is considered to be an opportunity to stake a first claim to the specialist area, while also providing opportunities to improve and further develop our existing on-campus MSc and national training material. • University of Liverpool's on-campus MSc Big Data and High Performance Computing: https://www.liverpool.ac.uk/study/postgraduate-taught/taught/big-data-msc/overview/ is more computer and data-science focussed than HPC focussed, but also benefits from the experience of an UK HPC centre, STFC Hartree – one of EPCC's competitors in the area, to provide the HPC knowledge to students. It also offers a 2-year option with a year in industry, directly competing with EPCC's programmes' strong links to industry through the industrial dissertation projects. It is our most direct competitor in the on-campus sphere and is a lower fee rate (~25% cheaper between Home and Overseas) than EPCC's on-campus programmes. ○ There is a similar programme, without the HPC offering, as part of Liverpool Online: MSc in Big Data Analytics: https://www.online.liverpool.ac.uk/programmes/msc-in-big-data-analytics, however Liverpool will not be accepting any online enrolments again until autumn 2021:

		https://news.liverpool.ac.uk/2018/10/03/new-direction-for-liverpool-online/. This therefore provides an opportunity to claim the online ground for an MSc in HPC offering. Fees information has been taken down. A 2020 launch for the Edinburgh programme will allow us to take advantage of this hiatus from a competitor. • Trinity College Dublin's on-campus MSc in High Performance Computing: https://www.tcd.ie/courses/postgraduate/az/course.php?id=DPTMA-HPCO-1F09 is more mathematically focussed and deals more with computational science. We have had a strong relationship with this MSc in the past and they have redirected some interested students to us if their interest aligns more with our MSc programme. However, the more attractive post-study work options for international students (especially given uncertainty over post-Brexit relationship with Europe) are beginning to siphon international applicants away from EPCC's MSc programmes and there has been a marked drop in applications and acceptances from Irish students in recent years. Their lower tuition fees (especially marked due to recent fluctuations in the value of the pound) and lower cost of living on-campus are also points of competition. TCD also benefits from some input and support from ICHEC, the Irish Centre for High-End Computing. There is currently no indication this programme may be liable to launch online soon. • Georgia Tech's MS Computer Science offers an on-campus specialisation in HPC: https://www.cc.gatech.edu/academics/degree-programs/masters/computer-science/specializations. The MS in Computer Science without HPC specialism is currently not offered, however. This programme is a known competitor, despite the higher fee levels, as some decliners specifically cite it. Given Georgia Tech's online learning activity it must be considered a powerful potential competitor should it launch its specific HPC specialism online. o Georgia Tech also offer some of their HPC-specific courses as free Micromasters programmes via the Udacity platform: https://eu.udacity.com/course/high-performance-computing--ud281 and https://eu.udacity.com/course/high-performance-computer-architecture--ud007. Thus an online-offering cannot be ruled out. • Other programmes with links to HPC, primarily in passing from the Data Science angle, exist already in the online sphere, such as Glasgow's MSc in Data Analytics: https://www.gla.ac.uk/postgraduate/taught/dataanalyticsonline/

Competitor Fees *Provide the fee structure (in British pounds) of three competitors,*	Institution	Programme	Fees		
			Online	Home	International

preferably those mentioned in the competitor analysis. These may be UK or International competitors.	University of Liverpool	MSc Big Data and High Performance Computing (on-campus: currently no online option)		8200	20550
	Trinity College Dublin	MSc High Performance Computing (on-campus currently no online option)		6333	16753
	Georgia Tech:	MS Computer Science: High Performance Computing Specialisation – on campus (Online rate is for MS Computer Science: currently does not include High Performance Computing as a specialism)	25732	23393 (in-state)	51464 (out of state)

FEES AND COSTING		
Programme fees *Fees are expressed per academic year in British pounds. For PGT programmes, a Programme Costing Template will also be required for Fee Strategy Group.*	Online	No programme fee for part-time intermittent programmes. Students to be invoiced on a per-course basis. Fees to be matched to Data Science, Technology and Innovation programmes (as most courses will be available on that DPT). 2019/20 fees (expected to rise in line with usual fee increases for 2020/21): 10 credits £865 20 credits £1,725 60 credits £5,170 Indicative cost for full MSc in 2019/20: £15500.
Fees for each new PGT programme are sent by College to the Fee Strategy Group (FSG) for review and approval. The FSG has developed a Programme Costing Template to give FSG insight into the anticipated profitability of a programme and where it sits within its market. The Fees Costings template, and guidance from FSG on filling out the template is included in the spreadsheet attached to the right.		

Additional Programme Costs (PGR only)

Additional costs to the student should be noted and justified in the table below. These should consist of items that are over and above the basic provision that should be available to all students and should reflect the special additional costs associated with the specific programme of study. Individual items over £200 should be noted on a separate row.

Item	Cost	% of Total
Add rows as necessary		
Total:		100%

ANTICIPATED AND PROJECTED ENROLMENTS *What are the anticipated and projected enrolments over the next three years?*			
	Year 1	Year 2 (Total population, not only new enrolments)	Year 3 (Total population, not only new enrolments)
Online	**3 FTE (~9 STUDENTS)**	**6 FTE (~18 STUDENTS)**	**10 FTE (~30 STUDENTS)**
Supporting Research What market research has been planned or completed to support the predicted student numbers?	• Based on 40 enquiries about Online versions of on-campus programmes received between March 2017 and February 2019 – including from other international HPC centres (such as CHPC in South Africa) about online training possibilities for professional development purposes. Initial discussions also held with members of the RSE (Research Software Engineer) community, to whom such a programme could be of interest as professional development, and employers within the sector (e.g. Nvidia), and beyond (e.g. HSBC, RBS) through direct contact, School of Informatics Industrial Advisory Board, and ongoing discussions. EPCC has extremely good standing within the UK and Europe as an HPC training provider and links to various related bodies which can be leveraged to increase market penetration. EPCC's strong links to industry (including MSc dissertation industrial projects) are also expected to play a key role in the success of the programme. EPCC's on-campus MSc programmes also have a wide network of alumni based across many different sectors of industry and academia, whose championing of our existing on-campus programmes is an important recruitment tool and we expect such support to carry over to an online MSc as well. • EPCC already plans to increase support for its existing on-campus MSc by adding an additional programme administrator to provide further throughput at peak times and to allow further recruitment activity for existing MSc and PhD programmes. Being co-located in the Bayes Centre with the DSTI programme team also provides opportunities for collaboration and synergistic recruitment efforts in the online learning sphere. Adding recruitment for the further online programmes would both provide further impetus for the existing programmes in markets (e.g. North America, Africa) where existing programmes have struggled to break through. • Launching these programmes is addressing a general lack of online study opportunities in this specialist area (as two of the institutions selected for Competitor Analysis – University of Liverpool and Georgia Tech are very active in the online learning sphere but do not offer this specialism online at present). Development of material for online learning will also provide opportunities to increase resiliency of the on-campus MSc programmes through the involvement of different staff. One key aspect of these proposed programmes is that of efficiency: the on-campus and online programmes will be specifically structured to complement each other, thus there is not anticipated to be a linear increase in resourcing requirements beyond student-specific activities (e.g. marking, student support) given student numbers. • Should recruitment targets not be met in years 3-4 of the programme the sustainability of the programme would have to be considered, however, as fees are paid on a per-course basis rather than on a programme-basis it is also important to note that additional fee income (not included in attached programme costing) is expected to be received from DSTI students taking the programme's courses (one of which – Practical Introduction to Data Science – forms a compulsory course for all DSTI students), with the two already extant courses having enrolments for credit in AY 2018/19 of 53 for Practical Introduction to Data Science and		

13 on Practical Introduction to High Performance Computing, thus showing there is demand for these topics already without the existence of a specialised online programme.

- Given the increasingly challenging market conditions for the on-campus MSc (despite recent successes in recruitment) the online MSc is also seen as an exercise in sustainability and increasing resiliency as many of these challenges do not apply in the online sphere. Challenges in the current market to the on-campus MSc include:
    - UK post-study work restrictions and uncertainty over Brexit are causing an increased number of international students to decline offers for the on-campus MSc programmes in favour of Trinity College Dublin's (TCD) programme and Ireland's more attractive post-study work options. Previously TCD's MSc programme sometimes acted as a recruitment tool for our MSc as, despite the similar names, their programme was more focussed on applied mathematics and computational science and they used to refer students more suited to EPCC's programme to us.
    - Increased cooperation between the University of Liverpool (a Russell Group competitor of UoE with particular market penetration online) and STFC Hartree Centre (traditionally one of EPCC's main national competitors as an HPC centre) on the MSc in Big Data and High Performance Computing (begun via: https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?GrantRef=EP/C530942/1).
    - The potential impact of Brexit on student recruitment from the EU (an absolutely key recruitment market for the MSc) and uncertainty over post-study work opportunities for EU students post-Brexit.
    - The on-campus MSc programme is approaching the maximum number of students that it can accommodate (40 total population) thus even if it manages to maintain such numbers in the wake of these challenging market conditions there is little or no possibility for further growth.
    - The on-campus programmes have struggled to achieve market penetration in key recruitment markets such as the USA (especially key from an HPC context) and emerging markets (e.g. Africa). An online programme is more attractive in emerging markets due to the lower costs (especially non-direct programme costs). The North American market is a natural recruitment market for an online MSc and, through greater exposure there and the potential for more collaboration with companies based in North America for industrial projects it is hoped that further recruitment effort will also benefit the on-campus MSc programme.
- No standalone market research conducted, but exploration of the possibility based on enquiries already received from prospective students who would be interested and employers who would be interested in such training as professional development (potentially employer-sponsored) for their staff.
    - The case of Dr Andy Law (of the Roslin Institute) provides an element of market research: Dr Law undertook the on-campus part-time degree utilising support from the Roslin Institute, graduating in 2017. In his opinion there are dozens of researchers whom he knows in the UK in his field (Computational Biology, Genomics, and Bioinformatics) alone who would see an online version of these MSc programmes as exceptionally useful and for which they could be sponsored by employers, but are unable to access an on-campus programme in Edinburgh. In addition to Dr Law's field of study there are many other areas of computational science whose researchers skills could be enhanced by such a programme. The on-campus programme at present also has a student with a PhD in Chemical Physics utilising the MSc programme in this way too.

PLANNING AND RESOURCES	
New Courses	• Two compulsory courses: Message-passing Programming and Threaded Programming have online course versions being submitted to the Informatics Board of Study alongside this proposal for approval to launch in January 2019, being offered to students on the DSTI programme. • At least two further online versions of existing on-campus courses are planned to be submitted for Board of Studies approval during 2019/20 to launch for September 2020: Programming Skills and Software Development (both compulsory). • The programmes' online versions of existing on-campus taught courses are planned to be submitted for Board of Studies approval during 2020/21 to launch for September 2021 or January 2022 (unless done sooner): Project Preparation (compulsory for MSc), Parallel Design Patterns, Performance Programming, Advanced Parallel Techniques, Design and Analysis of Parallel Algorithms. • The programmes' dissertation courses (online versions of existing on-campus dissertations to be taken over a full calendar year) are planned to be submitted for Board of Studies approval during 2021/22 to launch for September 2022 (unless done sooner): Dissertation (HPC), Dissertation (HPC with Data Science)
Facilities and Equipment	• Online course, thus no additional space requirements. • Resources would be the same as on-campus versions of courses with the vast majority of library materials already electronic. Access to machines is already remote and programme-level learning and teaching sessions such as EPCC Seminars are already available through Lecture Recording. • Students will require an internet connection and a desktop or laptop computer for programming exercises and accessing HPC services. Specifications are generally unimportant, although recommended to be able to view video content on Learn, as students will have access to University and EPCC resources such as the Cirrus National Tier 2 HPC Service and DICE for running programmes.
Staff	• All material is already taught on-campus and EPCC's Director has agreed to the required resourcing for teaching to be widened to online including review and preparation of material for the online environment (also beneficial to the on-campus courses and EPCC's national training efforts) and once the courses launch (especially during early years where student numbers may not match overheads). Online courses are mostly being scheduled in the opposite Semester from their on-campus equivalent in order to avoid too many peaks in effort for related groups of staff. Online delivery of material and increased use of discussion boards for online courses are also seen as entry routes into teaching of material for newer staff and will allow EPCC to build greater resiliency for staff changes through more staff having direct familiarity with material, which has in the past been a challenge for the on-campus programmes. • EPCC already plans to increase administrative support for its existing on-campus MSc by adding an additional programme administrator to provide further throughput at peak times, currently identified as required, and to allow further recruitment activity for existing MSc and PhD programmes and further development of industrial links: the addition of these MSc programmes to EPCC's portfolio of activity will be factored into this additional member of staff's job description. • The introduction of online courses and programmes is seen as a way to increase resiliency within the department across both our existing MSc programmes and training efforts. Key staff changes or unexpected lack of unavailability at present could be hugely

	damaging to the on-campus MSc programmes, thus utilising the online programmes to widen the pool of staff familiar with material and roles involved in running courses will be beneficial to the department.
Resource Sharing	• It is important to note that projections in the attached Programme Costing Template only take into account fee income from students on this programme, however two already extant courses have enrolments for credit in AY 2018/19 of 53 for Practical Introduction to Data Science and 13 on Practical Introduction to High Performance Computing, thus showing there is demand for these topics already without the existence of a specialised online programme. These additional enrolments from the DSTI programme will also serve to offset any loss-leading during initial runs of recruitment. All courses on this programme except Project Preparation (for now – pending discussion with DSTI programme) and the Dissertation will be made available to students on the Data Science Technology and Innovation (DSTI) programmes: Practical Introduction to Data Science is already a compulsory course on that programme, Practical Introduction to High Performance Computing is already an optional course on that programme. Both of those courses, and at least one of Message-passing Programming and Threaded Programming, are planned to form compulsory courses on a new DSTI specialism: Data Science Technology and Innovation (HPC) – to be suggested once the latter courses are approved). ○ Due to the programming languages commonly used in the field, there may be need of a bridging course to increase accessibility for DSTI students to some of the courses on this programme. While this course would not form part of this MSc programme it is possible that it may be a useful addition to the DSTI DPT. DSTI will be consulted about this and student demand will be assessed. • The programme is designed to be possible for students to take standalone without need for outside courses. Some School of Informatics courses identified as potential optional courses. Consultation has not yet taken place with the course organisers for Introductory Applied Machine Learning Image and Vision Computing, and Advanced Vision, however initial enrolments would be expected to be small and no enrolments are expected until 2021. • Future courses launched on the DSTI programme may also be of interest to students on this programme and discussions will take place as any such courses launch. • The programmes will share admissions requirements with existing on-campus programmes thus will add no additional complexity for admissions colleagues although their existence will entail a small increase in workload for the admissions team. EPCC already plans development of an interactive online programming test for use in admissions which will, we hope, reduce the burden for colleagues in admissions in assessing candidates' abilities.

COLLABORATIVE PROGRAMMES
Additional information is required for new programmes that are collaborations with external institutions or organisations which will result in a joint award and/or where taught components are shared. International partnerships must have a Memorandum of Understanding (MoU) in place before the programme can be approved by College. Should the proposal be progressed to Stage 2 a draft Memorandum of Agreement (MoA) will need to accompany the submission. Separate guidance is available for the development of collaborative programmes. http://www.ed.ac.uk/governance-strategic-planning/collaborative-activity/guidance-templates
• *Please provide brief details of partnership below, including confirmation of which institution will be the Administering University, the fee structure and confirmation of any external funding (if available)*

CONSULTATION AND APPROVAL

Programme Title:	MSc in High Performance Computing (Online Learning) / MSc High Performance Computing with Data Science (Online Learning)
Programme Proposer:	Dr David Henty & Mr Ben Morse

STAGE 1: CONSULTATION

Please confirm consultation with relevant stakeholders has taken place.

Stakeholder	**Yes**	**NA**
School Director of Professional Services (EPCC Director of Operations)	☒	☐
School Academic Administration Staff (EPCC MSc Programmes Officer)	☒	☐
Information Services (including Academic Support Librarians)	☐	☒
Student Body (SSLC/Student representatives)	☐	☒
Partner School Staff (E.G. Joint Programmes/shared courses etc)	☒	☐
Employers	☒	☐
Industry and Professional Bodies	☒	☐
External Consultation	☒	☒
Discussions have been had with members of the RSE community, Nvidia, Intel, RBS, national and international HPC Centres (such as CHPC in Cape Town) and academic researchers. EPCC regularly receives e-mails from employers asking for job vacancies to be passed to our MSc graduates at a rate which far outstrips the number of MSc students on the course, demonstrating a demand for students with these skills and the regard in which the existing on-campus programmes are held. As we are approaching maximum capacity for the on-campus programmes an online programme is the only way in which this demand can be further met.		

Please provide a brief comment on the consultation process

Internal consultation focussed on resourcing and benefits to EPCC in undertaking this programme. Overwhelmingly, although requiring resourcing input especially to set up, positives in efficiency and resiliency were identified which can be achieved through synergy with the existing on-campus programmes.

Please provide a brief comment on the consultation process with External consultants

External consultation focussed on enquiries as to the attractiveness and demand for such a programme. Given the identified skills gap in this area the programme was identified as useful both for those wishing to improve their skills to change careers/enhance career prospects and as continuing professional development. Those employers involved in the area identified opportunities to sponsor staff directly through staff development budgets either for the full award or for specific modules (hence the PPD route). A key driver has been the enquiries by potential students unable to access the on-campus part-time programmes due to not being based within Edinburgh. Both employers and those in related academic fields also raised this as a key area which the online MSc might improve.

STAGE 2: 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:
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 3: HEAD OF SCHOOL REVIEW AND APPROVAL

Head of School: *Please print name*
Comment and Approval:
Signature:

STAGE 4: COLLEGE CURRICULUM APPROVAL BOARD REVIEW AND OUTCOME

Date of CCAB:	
Convener Name:	
Stage 1 Outcome (please select as appropriate)	
Permission to proceed to Stage 2	☐
Permission to proceed to Stage 2 with conditions	☐
Proposal rejected with recommendations	☐
Proposal rejected	☐
Comment:	

Document Control

Date approved: Start date:	Amendments:	Date for next review: April 2018
Contact name & role: Matt Elliot	Department: College Academic Affairs	Email: Matt.Elliot@ed.ac.uk
If you require this document in an alternative format please email: deanqa@exseed.ed.ac.uk		