

College of Engineering and Technology
Department of Engineering

University of Derby Online Learning
Engineering

Programme Specification

MH7AH / OLPBJ

MSc Advanced Materials and Additive Manufacturing

Programme(s) valid from September 2016 - indefinite approval

JACS code: H790

Valid for delivery at:

University of Derby



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SECTION ONE: General Information

Programme Title	Master of Science in Advanced Materials and Additive Manufacturing	
Approval of Specification	31/05/2016	
Award Title & Interim Awards	MSc in Advanced Materials and Additive Manufacturing Interim awards; Postgraduate Diploma in Advanced Materials and Additive Manufacturing Postgraduate Certificate in Advanced Technology	
Mode of Study	Full-time: <input checked="" type="checkbox"/> Part-time: <input checked="" type="checkbox"/> E-learning: <input checked="" type="checkbox"/> Distance: <input checked="" type="checkbox"/> Sandwich: <input type="checkbox"/>	
Programme Start Date & Period of Validation	Start Date: September 16	Date of Last Update: 15/04/2016
	5 Years: <input type="checkbox"/> Indefinite: <input checked="" type="checkbox"/> Other (Please state):	
Awarding Institution	University of Derby: <input checked="" type="checkbox"/> Other (<i>Please State</i>):	
College Managing the Programme	Engineering and Technology	
Institutions Delivering the Programme	University of Derby: <input checked="" type="checkbox"/> Other (<i>Please State</i>):	
Relevant External Reference Points	<p>QAA Subject Benchmarks and External Accreditation The MSc Advanced Materials and Additive Manufacturing programme is designed to meet the QAA Materials Benchmark 2008, with reference to the draft Materials Benchmark for 2016 and Engineering Benchmark, 2015, and to satisfy accreditation at Chartered Engineer level under the umbrella of the Engineering Council UK but specifically through the Institution of Materials, Minerals and Mining (IOM³).</p> <p>The MSc Advanced Materials and Additive Manufacturing makes reference to the following documents and benchmarks:</p> <ul style="list-style-type: none"> • QAA Master's Degree Characteristics (September 2015) • The Framework for Higher Education Qualifications 	

	<p>2014</p> <ul style="list-style-type: none"> • UK Standard for Professional Engineering Competence (<i>UK-SPEC</i>) 2014 • UK Output Standards to Masters Degree (Eng Council July 2011) • Graduate Output Standard (<i>Engineering Professors' Council (EPC)</i>) http://www.epc.ac.uk/publications/standards/index.php
External Accreditation / Recognition	Appropriate accreditation will be sought following the first cohort completion. It is expected to get accreditations for this programme from the Institution of Materials, Minerals and Mining (IOM ³)
JACS Code(s)	H790 (JACS 3.0)

SECTION TWO: Overview

Background/Context:

Additive manufacturing is expected to have a profound impact on the way manufacturers make almost any product. (Foresight (2013): "*The Future of Manufacturing: A new era of opportunity and challenge for the UK Summary Report, The Government Office for Science, London.*") In recent years there has been a huge increase in awareness of this potentially disruptive technology and many businesses are now in the process of evaluating how to make effective use of additive manufacturing in their sectors. Industry faces a number of challenges which must be addressed in order to unlock the potential of additive manufacturing and on completion of this programme you will be equipped to evaluate whether there is a strategic benefit for an organisation in utilising advanced materials and additive manufacturing technology.

Derby is known for its industry in materials utilisation and for designing and manufacturing in complex geometries. This programme will enable you to appreciate how advances in materials and the development of additive manufacturing are particularly important to innovation in our regionally based international companies in the advanced technology industries of trains, planes and automobiles, as well as architecture and biomedical applications. Both OEMs and their supply chain SMEs have opportunities for graduates who can forge a future for their companies in this exciting area of materials and manufacturing development and you will be well placed to take up these.

HEFCE recognised the importance of developing the MSc in advanced materials and additive manufacturing by an award for its development and promotion to the University in 2016. The programme provides routes into high demand engineering sectors for graduates from backgrounds in analytical disciplines such as chemistry, biology, geology and related areas, to enter the engineering profession. Both on campus delivery and online learning are available so that you are able to access the programme in the UK and throughout the world. The course is also offered both in full time and part time modes so is relevant if you are already working in the industry to enhance your career or if you are seeking to enter the sector.

Overview of the Programme:

The MSc in Advanced Materials and Additive Manufacturing is designed to provide an academically challenging and vocationally relevant postgraduate qualification that is specialist and distinctive in its field and provides you with the skills and confidence that is required within for your career. It will equip you with a solid background and appropriate skills that will enable you to practice successfully as a professional chartered engineer (CEng).

Operating within the current structure of all MSc programmes in engineering and built environment disciplines within the College of Engineering and Technology you will share a number of core modules with other programmes. This will allow you to gain a wider view of how advanced materials and additive manufacturing aligns to other disciplines and be able to undertake group projects which bring together masters' students across the whole of engineering and technology. These modules, which have been designed to align to key competences within UK-Spec for a chartered engineer, include:

Research Methods, Application and Evaluation (10 credits)
Environmental Risk and Responsibility (10 credits)
CPD and Strategic Management (20 credits)

There are three knowledge streams; material selection and processing, geometrical component optimisation and analysis of the business strategy and how it will impact existing processes. Your programme provides flexibility in module choice with opportunities to specialise in component design, or management of the additive manufacturing process and its supply chain, or analysing and displaying large datasets. This programme is academically rigorous, completely related to practice and specially designed to provide engineering graduates and others professionals with an engineering background to pursue careers in management positions within engineering and manufacturing sectors.

The staff are very experienced in their specialist fields and the subject areas of the modules reflect these research or consultancy specialisms. This means that in postgraduate study you will be studying some of the latest technical theories and applications, being taught by people who are recognised experts in their field. Specialist subjects include:

- Advanced materials including fibre and nanocomposites
- Advanced surface engineering and tribology
- Biomedical engineering materials and bio-interaction
- Advanced manufacturing including additive manufacturing
- Application of VR in manufacturing engineering
- Optimisation of manufacturing technologies and organisations
- Lean and strategic operational management

Key Characteristics:

This programme has a flexible delivery model to meet multiple needs with full time, part time and distance learning including 3 entry points in the year.

An interdisciplinary focus throughout the programme enables you to appreciate how different professionals collaborate within this diverse field. The teaching, assessment and support are aimed at developing your academic and practical skills competences relevant to employers or further study. Whether you want to work or follow an academic path, you will enter the field of additive manufacture with confidence.

Academic and Employment attributes are supported by:

- Links with local and global OEM manufacturers and their supply chains.
- Underpinning research in the field of advanced materials and manufacturing.
- High quality teaching involving experts from industry.
- Enhanced employability and personal development through personal tutoring, interaction with the Careers Service and the use of real world assessments.
- Design based exercises reinforcing theory and practice together to improve your skills and knowledge base.
- Professional accreditation is being sought with IOM3

The MSc programme will provide opportunities for you to develop:

- Specialist in-depth knowledge and understanding of advanced materials and additive manufacturing through real world applications and underpinning research.
- Versatility and creativity in the application of advanced knowledge and practice within materials and additive manufacturing.
- Imaginative, research, systemic and innovative skills to extend your knowledge and skills base within the programme area.
- An enhanced treatment of business and management that aids progress to a position of responsibility.
- Greater confidence to manage projects and to take responsibility for leadership in major engineering projects (CEng).

Programme Aims:

The MSc Advanced Materials and Additive Manufacturing programme aims to:

- Provide flexible learning opportunities of a high standard in the fields of materials science and manufacturing technology, accessible to part-time and full-time students, whether local, EU or international.
- Ensure that opportunity is equally available to all who have the potential to benefit from it, regardless of race, nationality, or disability.
- Provide routes into high demand engineering sectors for graduates from related disciplines.
- Offer a sector relevant award obtained through an academically rigorous, intellectually stimulating, research orientated and challenging programme of study.

SECTION THREE: Programme Learning Outcomes

Generic Learning Outcomes

Upon completion of this MSc programme in Advanced Materials and Additive Manufacturing, you should be able to:

1. Demonstrate a systematic understanding of the knowledge base and a critical awareness of current problems and developments at the forefront of the manufacturing engineering discipline.
2. Conduct research using appropriate techniques and enquiry methods, and be able to apply advanced knowledge and practice in an original manner, to the solution of complex situations within the materials or manufacturing engineering disciplines.
3. Critically evaluate current research and advanced scholarship in the advanced materials and manufacturing engineering disciplines.
4. Use appropriate decision-making techniques including identifying, formulating and solving complex additive manufacturing and business problems; and the ability to create, identify and evaluate options; the ability to implement and review decisions.
5. Manage complex technical and strategic issues systematically, systemically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences.
6. Demonstrate self-direction and originality in tackling and solving additive manufacturing and management problems, and be able to act autonomously in planning and implementing tasks at a professional level.
7. Apply knowledge and understanding of business, materials and additive manufacturing to complex issues, both systematically and creatively, to improve

current practice

8. Advance your knowledge and understanding of the materials and additive manufacturing disciplines, and to develop new skills to a high level for continuing professional development.
9. Exhibit qualities and transferable skills necessary for employment within the advanced materials and additive manufacturing requiring the exercise of initiative and personal responsibility and decision-making in complex and unpredictable situations.

The Specific Learning Outcomes for the MSc Advanced Materials and Additive Manufacturing programme are listed below:

Knowledge and Understanding – You will have:

PG Certificate Stage

1. A comprehensive knowledge of areas of advanced technology which include materials engineering or additive manufacturing processes with critical evaluation of real world technical and engineering applications.
2. A comprehensive understanding and critical awareness of Additive Manufacturing Systems, and the methodologies used for selection and evaluation of their impact in a manufacturing scenario.
3. A critical awareness of current research and developments in materials and additive manufacturing.
4. The underpinning principles of design for additive manufacturing and a comprehensive knowledge of the tools used to design and prepare files for additive manufacturing.

PG Diploma Stage

1. A comprehensive knowledge of areas of advanced technology which include materials engineering and additive manufacturing processes with critical evaluation of real world technical and engineering applications.
2. The principles of optimising design for Additive Manufacturing Processes.
3. Used techniques to select and implement additive manufacturing, demonstrating an understanding of its relationship to the wider context of engineering.
4. Advanced understanding of developments in materials and additive manufacturing processes and critical evaluation of the impact these may have on the discipline.
5. Appreciation of regulations and ethical principles which inform or restrict the development of designs for additive manufacturing.

Masters Stage

1. Knowledge of Advanced application of Engineering Materials and Additive Manufacturing Processes.
2. A comprehensive understanding of research techniques and enquiry methods and to be able to apply advanced knowledge and practice in an original manner to the solution of complex situations within the additive manufacturing discipline.

Intellectual Skills – the ability to:

PG Certificate Stage

1. Use fundamental knowledge to investigate new engineering tools/techniques and relevant application technologies.
2. Apply advanced engineering tools and techniques to solve complex problems and make decisions: establish criteria, using appropriate decision-making techniques including identifying, formulating and solving engineering problems; and the ability to create, identify and evaluate options; the ability to implement and review decisions.
3. Extract data pertinent to an unfamiliar problem, and effect solutions using computer based tools when appropriate.

PG Diploma Stage

1. Use fundamental knowledge to investigate additional new engineering tools/ techniques and relevant application technologies.
2. Apply advanced engineering tools and techniques to solve further complex problems and make strategic decisions: establish criteria, using appropriate decision-making techniques including identifying, formulating and solving engineering problems; and the ability to create, identify and evaluate options; the ability to implement and review strategic decisions.
3. Extract data pertinent to further unfamiliar problems, and effect solutions using computer based tools when appropriate.
4. Debate contemporary issues related to the engineering discipline.
5. Critically discuss the importance of Additive Manufacturing on a global scale.

Masters Stage

1. Use fundamental knowledge to investigate further additional new engineering tools/ techniques and relevant application technologies.
2. Apply advanced engineering tools and techniques to solve additional further complex problems and make strategic decisions: establish criteria, using appropriate decision-making techniques including identifying, formulating and solving engineering problems; and the ability to create, identify and evaluate options; the ability to implement and review strategic decisions.
3. Extract data pertinent to further unfamiliar problems, and effect workable solutions using computer based tools when appropriate.
4. Debate contemporary issues in Additive Manufacturing in a thesis.

Practical/Subject Specific Skills – the ability to:

PG Certificate Stage

1. Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.
2. Generate novel designs for products, systems, or processes.

PG Diploma Stage

1. Use wide knowledge and comprehensive understanding of design processes and methodologies and further apply and adapt them in unfamiliar situations.
2. Generate novel designs for products, systems, or processes and evaluate alternative strategies.
3. Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.
4. Design for, prepare, setup and operate additive manufacturing equipment and identify

causes of errors.

Masters Stage

1. Use wide knowledge and comprehensive understanding of design processes and methodologies and further apply and adapt them in unfamiliar situations and discuss the results in a thesis.
2. Design for, prepare, setup and operate additive manufacturing equipment and evaluate the impact of changing control parameters.

Transferable Skills – the ability to:

PG Certificate Stage

1. Display resourceful solutions to the limitations of current Engineering practice.
2. Apply extensive knowledge and understanding of a wide range of engineering, manufacturing and materials principles.
3. Critically identify engineering problems at the product and process design stage.
4. Critically apply advanced engineering management tools to a variety of situations.

PG Diploma Stage

1. Explore professional development opportunities related to the Engineering and Manufacturing sector at Chartered Engineer level.
2. Display resourceful solutions to the limitations of current Engineering practice.
3. Critically identify an engineering problems at the product and process design stage
4. Critically apply advanced engineering management tools to a variety of situations.

Masters Stage

1. Display resourceful solutions to the limitations of current Engineering practice and discuss them in a thesis.
2. Critically identify engineering problems at the product and process design stage and discuss them in a thesis.
3. Critically apply advanced engineering and management tools to a variety of situations and discuss them in a thesis.

These specific learning outcomes are mapped against individual modules as shown in appendix 1. In addition the programme is mapped against masters level requirements of the Institute of Materials, Minerals and Mining through statements linked to QAA benchmarks (2015) and the requirements of UK SPEC (3rd edition 2014) for CEng. See appendix 2.

SECTION FOUR: Programme Structure & Curriculum

Structure and curriculum

The following diagrams show the modules available in each semester / trimester, as well as their core or optional status. Modules totalling 60 credits must be passed in each stage, including all core modules. There are 3 optional modules in the programme, two optional modules are required to PG diploma level.

As all modules are credited as Level 7, there is some flexibility in configuring an individual programme of study.

An important part of study at the master level is the 60 credit independent scholarship. You will undertake this module in the final semester of the Master Programme following the taught part of the programme. This Independent Scholarship (Technology) is an in-depth design and test study within the discipline area linked to the programme learning outcomes, requiring a high standard of investigation and presentation. The subject of this project will be result of academic counselling by programme leader at your career progress aims.

It is possible to study either in full or part-time modes on campus or part time online.

On campus study covers 2 Semesters per academic year, September to August with three modules (60 credits) per semester full time or two modules (40 credits) part time.

Full-time study – September to August (1 calendar year)

Part-time study – September or January start typically for a minimum of 2 years

Note that due to co-delivery of modules the full time entry point in January is only available to cohorts of students.

January to June (1.5 calendar year)

The online study mode covers three Trimesters per academic year, September to August with three intakes a year and can be studied at a standard rate (20 credits / one module per trimester), or accelerated (40 credits / two modules per trimester).

Modules included are below, the first module code is for on campus and the second is for online;

Core MSc Specific Modules (PG Certificate)

7TE506 / 7TE510, Research Methods, Application And Evaluation (Taught Pg), 10 credits

7TE507 / 7TE513, Environmental Risk and Responsibility, 10 credits

Prescribed MSc Specific Modules (PG Certificate)

7ME516 / 7ME535, Advanced Materials Science, 20 credits

7TE514 / 7TE515, Additive Manufacturing Processes, 20 credits

Core MSc Specific Module (PG Diploma)

7ME502 / 7ME524, Continuing Professional Development and Strategic Management, 20 credits

Optional MSc Specific Modules (PG Diploma)

Choose 2 modules from;

7TE516/ 7TE517, Additive Manufacturing Applications, 20 credits

7TE518 / 7TE519, Design and Material Selection, 20 credits

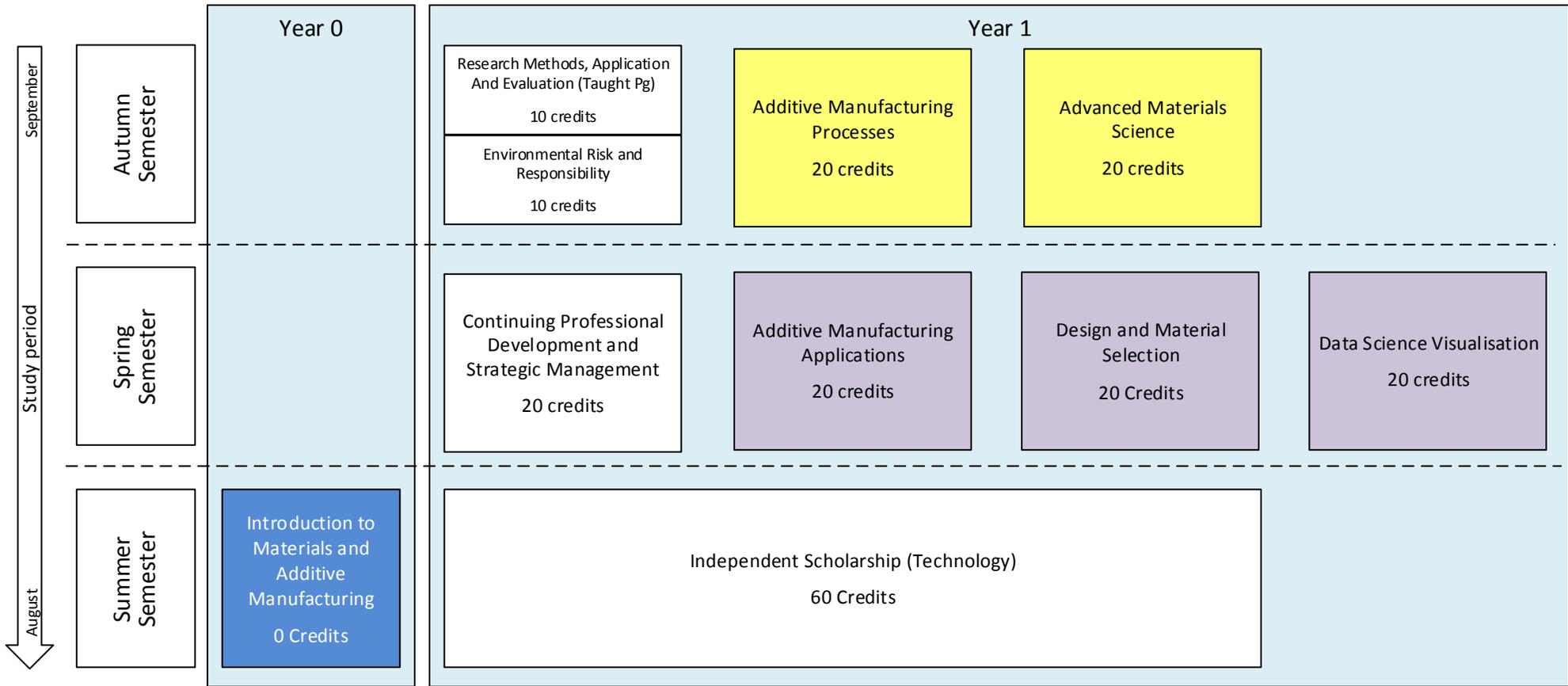
7CS523 / 7CC524, Data Science Visualisation, 20 credits

Core MSc Specific Modules (PG Masters)

7ME999 / 7ME525, Independent Scholarship (Technology), 60 credits

On campus full time study pattern

Indicative full time study (on campus)

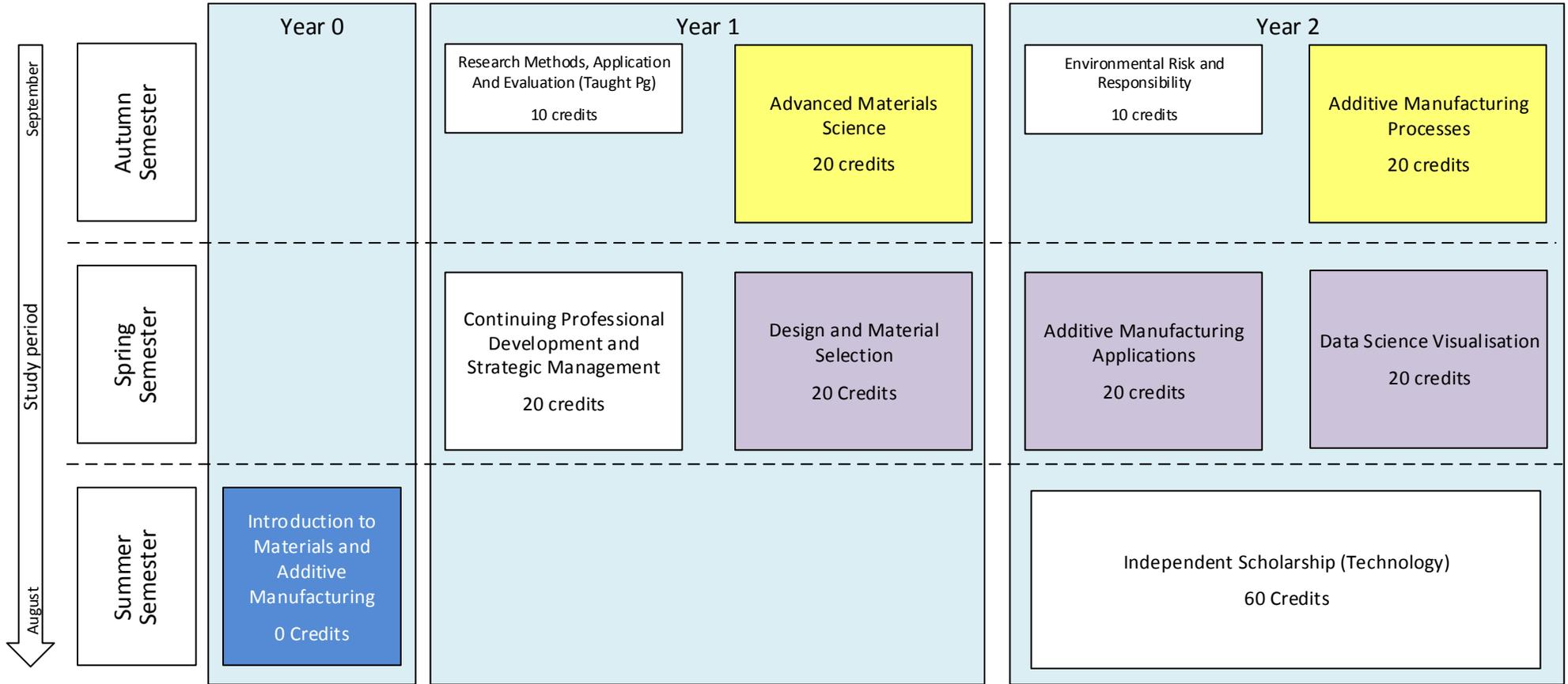


Legend

Core	Bridging module	Optional
Prescribed		two optional modules must be studied to complete the programme

On campus part time study pattern

Indicative part time study (on campus)



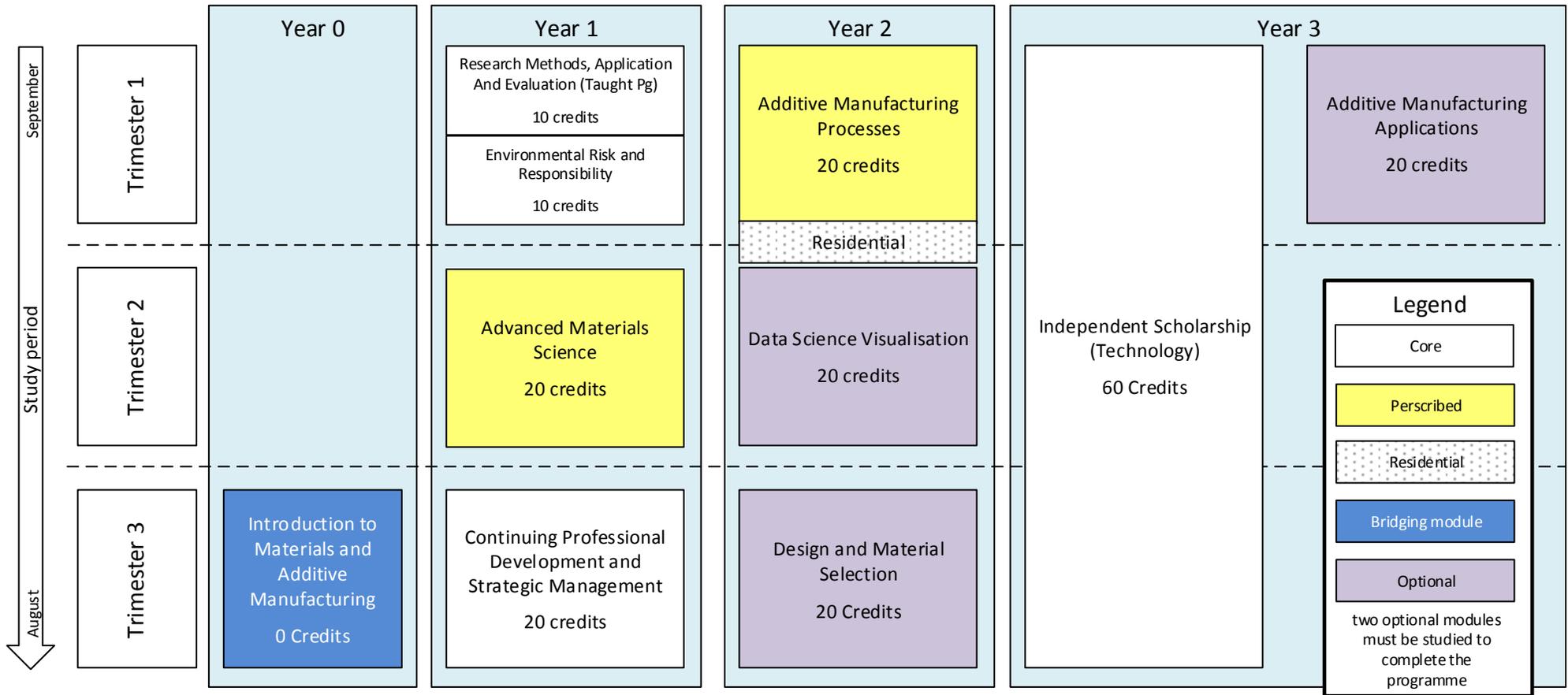
Legend

- Core
- Bridging module
- Optional
- Prescribed

two optional modules must be studied to complete the programme

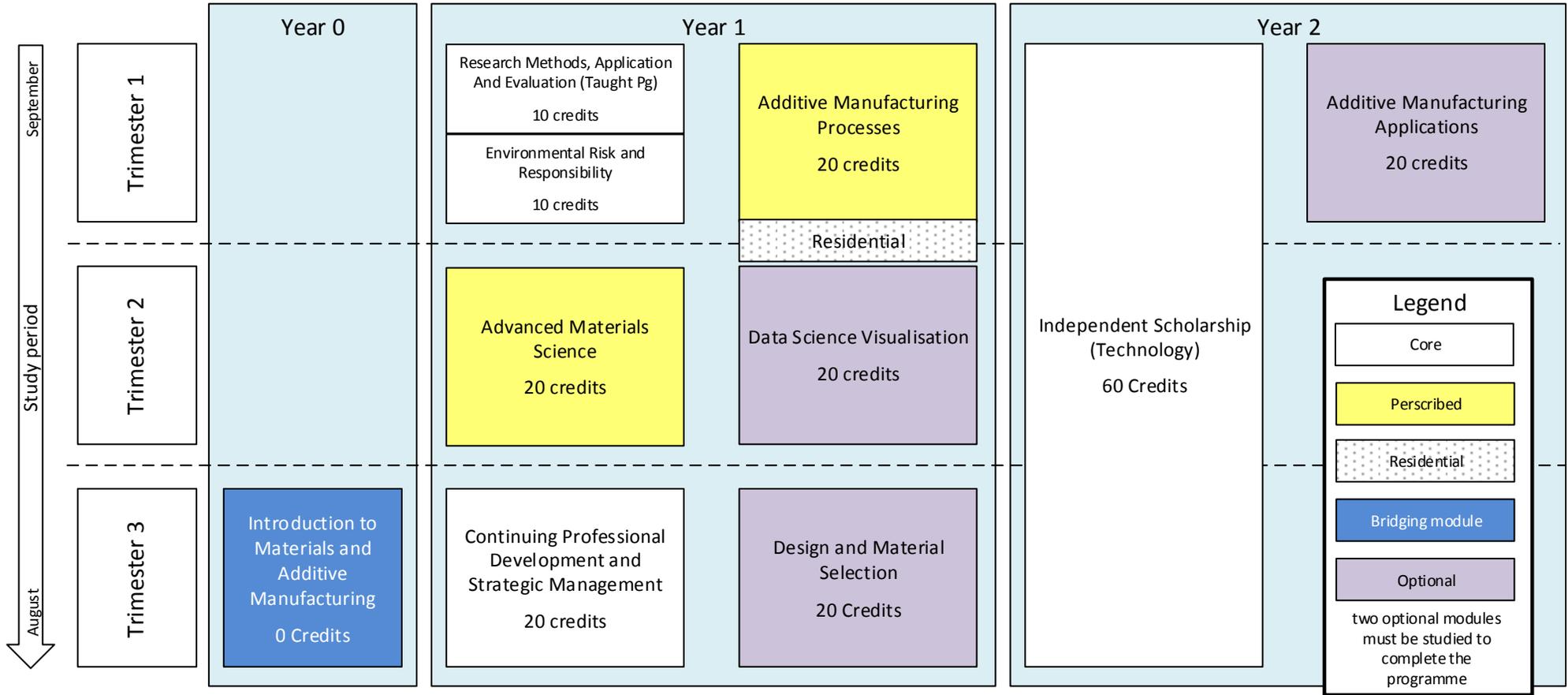
Online standard study pattern

Indicative standard study (online)



Online accelerated study pattern

Indicative accelerated study (online)



SECTION FIVE: Learning & Teaching

Learning and Teaching Methods

A variety of teaching and learning strategies will be employed in accordance with the University of Derby's Learning and Teaching Strategy v3.¹ The programme team have applied the principles of Student Employability, Teaching Quality and Research in the Curriculum from the Draft Learning and Teaching Strategy to the development of the learning and teaching methods used in the programme. In particular the programme aims to provide a sector leading dynamic and stimulating learning environment for your postgraduate studies.

When you undertake postgraduate studies you are already an experienced learner who engages fully in all the types of learning methodologies. As you progress through the programme you will expand your experience with research methods and academic practice with small scale projects within each module. The number of modules to be studied (either 10 or 20 credits) provides flexibility, clarity and manageable assessment tasks.

As a student of the University you must comply with the University's Policy and Code of Practice related to Research Ethics² and you should also to be aware of your Intellectual Property Rights (IPR)³.

You will be able to fully engage with your peers through collaborative and stimulating online activities designed to investigate current trends within the industry, whether UK specific or international in nature. Your engagement with the programme is a key element of learning, whether online or on campus. Discussions with peers and articulating your understanding of the subject will improve retention of knowledge and provide critical debate. This type of engagement is an ideal way to receive feedback on academic skills, such as referencing and critical thinking prior to larger assessed tasks. This learning is typically embedded into the formative activities and delivery. In most modules a component in the assessed coursework will include a mark derived from your engagement or collaboration in the programme. The assessment brief will outline marks allocated for engagement, amounting to no more than 10% for the overall module. This type of assessment will follow the principles of assessment for learning³.

The programme has been designed to enable access a wide range of backgrounds and personal situations. To achieve this the programme has full and part time on campus study modes and has the option of online study mode over an extended period for those in work or not able to attend the campus. To allow entry for different backgrounds, the bridging module offers an introduction to the theory and tools used within the materials and manufacturing discipline.

Learning and teaching methods: On campus study

Lecturers on the programme will act both as facilitators of your learning experience as well as subject based experts.

¹<https://staff.derby.ac.uk/sites/IE/LT/layouts/15/start.aspx#/SitePages/Learning%20and%20Teaching%20Strategy.aspx>

² www.derby.ac.uk/3rs Student University Polycys, part C, Research Ethics

³ <http://www.aaiia.org.uk/afl/assessment-reform-group/> Assessment for Learning – 10 principles

You will engage in a combination of teaching methods, which include real world case studies, work-related learning, research-based learning, scenario based learning, laboratories, guest lectures from industry specialists, individual and group project works and interactive online materials. Whenever possible you will be encouraged to relate your academic studies to practical activities in which you may be professionally involved, or are interested in, current to the workplace.

You will follow a blended learning approach to learning which involves a combination of taught face-to-face modules and modules delivered online. All modules will have electronic support via the University's UDo (Derby Platform for Online Teaching) website, in accordance with the University's Learning and Teaching Strategy. The design gives you the flexibility to study at a time, pace and place most suitable for you, whilst receiving support and guidance from your academic tutor.

Some module will have practical sessions scheduled during the teaching semester. These practical sessions and assessments will aid you in gaining hands on experience of a range of AM processes and be able to identify significant operational control and management constraints. Attendance of 80% will be required to pass the modules with these sessions.

Learning and teaching methods: Online study

For online learners, this programme is underpinned by the University of Derby Online Learning's Academic Framework. This framework outlines the teaching and learning approach taken within modules delivered through the online mode. Modules within the MSc Advanced Materials and Additive Manufacturing use the "Self-paced, Supported Online Learning" learning design, the "Collaborative Online Learning" design and the "Reflective Online Learning" design.

The key features of self-paced, supported online learning are:

- You can work through the module at your own pace, with a tutor and peer group to call on for support, with a set of optional tasks to undertake to support your learning and with explicitly identified formative assessment activities about which you receive online feedback and guidance from your online tutor.
- You are provided with a set number of units of learning content. Content can be textual; can include video and audio material, screencasts or presentations with voiceovers.
- Each unit of content contains optional tasks for you to undertake to apply or 'process' the content. These activities will include suggestions for postings you could make in the community space for the module.
- Each module contains explicitly identified formative assessment activity that you can undertake and for which you can expect to receive feedback from your tutor.
- You may be provided with the opportunity to participate in a set number of live classroom sessions during the module (and recordings of these sessions will be made available to everyone on the module).

The key features of collaborative online learning are:

- At a set point or points within the module, you are required to participate in online collaborative activity with a small group of your peers which contributes towards your final assessment for the module.

- A primary responsibility of the tutor will be to facilitate the assessed collaborative activity.
- The collaborative activity will take place within a private space for each group within the module's 'Community space' on Blackboard.
- You are provided with a set number of units of learning content. Content can be textual; can include video and audio material, screencasts or presentations with voiceovers.
- Some of the units of content contain optional tasks for you to undertake to apply or 'process' the content.
- There will be a community space / discussion area for the module which is the primary space for you to receive support from tutors and peers.
- The community space / discussion area will be lead and managed by online tutors.
- You may be provided with the opportunity to participate in a set number of live classroom sessions during the module (and recordings of these sessions will be made available to everyone on the module).

The key features of reflective online learning are:

- As you work through the module, you are set activities that require you to contribute to a 'portfolio' of work or continuous reflections which contribute to your final assessment for the module.
- The portfolio or collection of reflections (which may be a blog or journal) can be used to assess knowledge, to assess reflective skills (such as analysis, synthesis or evaluation, often higher level skills) or to assess development over a period of time.
- You are provided with a set number of units of learning content. Content can be textual; can include video and audio material, presentations with voiceovers.
- There will be a community space / discussion area for the module which is the primary space for you to receive support from tutors and peers.
- The community space / discussion area will be lead and managed by online tutors.
- A primary responsibility of the tutor will be to facilitate and provide formative feedback on the production and development of your portfolio of work.
- You may be provided with the opportunity to participate in a set number of live classroom sessions during the module (and recordings of these sessions will be made available to everyone on the module).

A common approach is for regular activities to be set based on the content of an online unit and then you are provided with the opportunity to discuss this work in online discussions. Feedback may be in groups or to you individually.

If you are studying online the majority of the programme will be through the study of online learning modules, although some incorporate practical elements that may have to be completed at the University or with appropriate equipment or software elsewhere which will be specified in the module handbook. These practical sessions and assessments will aid you in gaining hands on experience of a range of AM processes and be able to identify significant operational control and management constraints. Attendance of 80% on at least one residential will be required to pass the programme. Note recognition of prior learning cannot be offered for part of a module, please see SECTION SEVEN: Admission for more detail.

The residential sessions are also an opportunity to reinforce the cohort culture established during the online study activities.

With the availability of additive manufacturing 'mail order' globally, you will have the opportunity to create artefacts from your designs. Key demonstrations and processes will be documented and videos made available to show the operation of equipment before you use it during the residential period.

More detail on the University of Derby Online Learning's Academic Framework (which has been approved by the University's Academic Board) can be found at:

<http://www.derbyonlinelearning.co.uk/content1.asp?MenuID=3641&courseId=UDO7714>

Student Support

The University maintains standing committees on equality and diversity which directly address accessibility and student support in its normal operation, the teaching materials and rooms have established accessibility functionality to accommodate most common student needs. Where appropriate lecture notes and recordings are made available to you to aid in note taking and revision. Student Advisors, Support Workers and Specialist Tutors are available to help with individual needs. The programme is primarily based at Markeaton Street for on-campus students, which incorporates the latest standards for accessibility, including full access for wheelchair users and appropriate facilities for other disabilities. Some modules may be based at other sites, which have also been recently refurbished to meet current standards.

You may require additional learning support beyond the provision already in place, for more information see the student wellbeing⁴ website.

You will need to obtain an individual support plan with agreed recommendations from student wellbeing. These recommendations can include issues around learning materials (paper colour, font size, font style, etc), organisational / time management and assessment procedures.

If you have already been identified as requiring additional learning support, or suspect that you may need it, please speak to the Programme Leader as soon as possible so that appropriate steps can be taken to allow you to succeed on the course. If indicated, individual support plans are communicated to the delivery team who work with the student to carry out the recommendations.

For online study the materials are created with consideration to diverse needs, for example videos have transcripts and text supports screen readers.

Research Governance and Ethics

All students are required to comply with research governance and ethics principles whilst undertaking their programme of study⁵. The College Ethics Committee will review all of the postgraduate independent study proposals. This is of particular importance when conducting research involving other people e.g. for module assessments or Independent Scholarship (Technology). Information on these principles can be found on the University web site at www.derby.ac.uk/research

⁴ <http://www.derby.ac.uk/campus/support/>

⁵ www.derby.ac.uk/3rs Student University Policies, part C, Research Ethics

Independent Scholarship (Technology)

Independent scholarship forms an essential, integral and substantial part of programmes leading to the master's degree. Independent scholarship, via the Independent Scholarship (Technology) module, contributes 60 credits towards the master's degree. Independent scholarship is not restricted to traditional academic studies. You may carry out independent scholarship in collaboration with local employers, industry, commerce, the professions or the voluntary or statutory sectors. These studies will require careful liaison between the University and employers to ensure that employment and industrially based projects have appropriate academic rigour.

The programme leader assigns a member of staff responsible for the coordination of supervision and monitoring of your progress. You will be assigned a supervisor. It is the responsibility of the supervisor to provide academic guidance in the conduct of the research work you undertake. The supervisor is also responsible for monitoring your progress and providing proactive academic and pastoral support. If you are a part-time student you will also have the opportunity to be assigned an industrial mentor who will support you with regards to the day-to-day queries that you might have and will support you by providing time and resources in order for you to be able to carry out the work successfully and efficiently. The industrial mentor will have no input into summative assessment but will provide formative feedback your overall performance at the company with specific reference to work related learning.

As a reflection of its five core organisational values, the University is concerned to protect the rights, dignity, safety and privacy of research subjects, the welfare of animals and the integrity of the environment. The University is also concerned to protect the health, safety and academic freedom of researchers and the reputation of the University as a centre for appropriately conducted high quality research. Underpinning the standards are the ethical imperatives of Do No Harm (non-maleficence) and Do Good (beneficence). Therefore, you are required to submit your Independent Scholarship (Technology) proposal to the College's Ethics Committee for approval.

Independent Scholarship (Technology): Online Study

If you are studying online you may wish to undertake a project within your workplace. Agreement of such placements will need to be confirmed with the employer and the University before the commencement of the independent scholarship module.

Sharing, Developing and Reflecting

Sharing, developing and reflecting on your learning with other students and staff is an important part of achieving your potential in postgraduate study. In order to be able to facilitate this you will be part of an online postgraduate learning forum, where you can share ideas and experiences and reflect on a module or programme.

Facilities provision: On campus study

While on campus you will use the University's computer facilities, for the teaching of computer aided design and other related IT work in a wide selection of modules. The facilities available for these modules include dedicated computer studios with the appropriate software required to teach these modules.

Facilities provision: Online study

If you are studying online you will have access to core software packages to use during their studies and where appropriate open source / free tools will be used to deliver on the requirements of the course. While every effort is made to use software that is free or licenced for all university student use, some specific packages may be limited to the provision of on campus hardware which will be used during the practical sessions.

SECTION SIX: Assessment

This programme operates within the University's Regulatory Framework and conforms to its regulations on assessment⁶. A mixture of assessment methods will be used on the programme, with a strong commitment to deep learning and aimed at continuously developing you as an independent learner throughout your studies. This will be supported by the assessment for learning detailed in the teaching and learning section. All assessments set will contain a clear statement of the expected learning outcomes, task briefs, submission requirements and performance criteria.

Assessment: On campus study

The MSc Advanced Materials and Additive Manufacturing will use a range of assessment techniques including laboratory based project design work, design briefs, project reviews and portfolios, assignments, case studies, oral and graphic presentations, collaborative, online, and interdisciplinary team work projects and examinations, so providing a flexible and effective means of assessing your progress. Theoretical concepts and practical application will be covered in traditional lectures, supported by laboratory based sessions, tutorials and seminars.

Some module will have practical sessions scheduled during the teaching semester. These practical sessions and assessments will aid you in gaining hands on experience of a range of AM processes and be able to identify significant operational control and management constraints. Attendance of 80% will be required to pass the modules with these sessions.

Assessment: Online study

You will be assessed in the same manner as the on campus study. Access to physical laboratories will be limited to the residential weeks offered in some modules. These practical sessions and assessments will aid you in gaining hands on experience of a range of AM processes and be able to identify significant operational control and management constraints. Attendance of 80% on at least one residential will be required to pass the programme. The residential will also have examinations for the connected module which will contribute to the final mark.

For some modules you may validate designs by manufacturing them, this can be done using commercial facilities or the university facilities. During the module study period you can either attend the campus to use the facilities or use the pre-arranged design drop off dates to have designs printed, documented and fed back on by on campus staff.

⁶ www.derby.ac.uk/3rs Regulations, part G, Assessment regulations for postgraduate programmes

SECTION SEVEN: Admission

You can enter the programme with a suitable undergraduate qualification or equivalent in engineering with a grade of 2:2 or above. For general entry requirements please see the university website⁷.

Equivalent professional qualification or significant industrial and professional experience may be accepted as part of the admissions process. Minimum experience of 3 years in a manufacturing or materials technical role. You will be asked to evidence your technical academic writing at the equivalent of level 6 under the Qualifications and Credit Framework (QCF)⁸. Evidence might take the form of a portfolio used for professional membership or the completion of certificated programme at level 6 for example. Note that your application for chartership with IOM3 or other professional body may be affected if you do not have a qualifying accredited undergraduate qualification.

Recognition of Prior Learning (RPL) may be possible based on evidence of certified qualifications and experiential learning. This will allow you to use your existing knowledge and skills to give you credit against modules you are required to study for the programme. Whilst the University guidelines on prior learning will be followed⁹, RPL will only be recommended where applicants can present a portfolio of professional work, deemed to be of an appropriate level. If you feel you have substantial prior experience, or equivalent qualifications, that match a module please speak to the Programme Leader about this process.

If you have existing undergraduate qualification in a related discipline area e.g. Chemistry, you can enter the programme after the engineering bridging module, Introduction to Materials and Additive Manufacturing. This module is offered as a precursor to the main body of the programme (upto 17 weeks prior to) either in May or September depending on your entry point. The module is delivered online over 10 weeks, there is a significant breadth of knowledge to cover and it is expected that because of your background some areas may be more familiar than others. The Programme Leader / Academic Lead will decide on your suitability for the programme based on qualifications and prior experience.

Applications

Applications for all full time students and part-time students are made directly via the apply online portal for either mode of study, <http://www.derby.ac.uk/study/apply/apply-online/> .

International Students

As the course has a mandatory residential in the UK at the Derby campus you will need to be able to obtain a short term study visa for the UK.

You should also check the current UK Visa requirements detailed on the International Student Website. This site contains specific information of interest and relevance to International students is contained on the International Student Website

<http://www.derby.ac.uk/international/>

⁷ <http://www.derby.ac.uk/study/undergraduate/apply/entry/>

⁸ <http://www.accreditedqualifications.org.uk/qualifications-and-credit-framework-qcf.html>

⁹ www.derby.ac.uk/3rs Regulations, part C, Recognition of Prior Learning (RPL)

If your first language is not English you will need to attain a minimum of IELTS 6 (with a minimum of 5.5 in all areas).

University admissions policy requires competence in the English language. It is not envisaged that students from different cultural backgrounds will be disadvantaged by the learning, teaching and assessment strategy outlined, provided the language requirement is satisfied.

The requirement for a language qualification can be waived if you can provide evidence of your competence. Decisions in such cases are made on an individual basis according to the specific circumstances. For any further enquiries, please visit University of Derby Admissions at <http://www.derby.ac.uk/study/apply/>

Students with additional needs

The University and Programme Team welcome applications from students with disabilities. During the application process you are given the opportunity to declare any additional needs, these will only be passed onto the student wellbeing service. You can find out about the support provided in the Learning and Teaching section of this document.

SECTION EIGHT: Student Support & Guidance

Student Support and Guidance

The University offers a range of support and advisory services for you. Most services are accessible to you on either study mode via the online UDo portal with details on how to make appointments if you would like to discuss personal or academic related matters in more detail. These appointments can be online or face to face.

The provision is undergoing continuous improvement informed by student feedback and demand, you will be notified of key events but it is also worth while keeping up to date with the provision at the time.

Further information can be found on the listed websites, the two areas that coordinate the support are student wellbeing and the library, links below;

<http://www.derby.ac.uk/campus/support/>

<http://www.derby.ac.uk/campus/library/>

There is a full induction programme for you at the beginning of the academic year which includes learning centre provision and introduces you to relevant support systems and staff.

If you are on campus, drop-in services are available to help you in a range of areas. Advisors are available to help you if you are studying online.

You will be required to use University of Derby Online (UDo) which provides more information about the programme and the University.

Each site has a Student Information Centre offering a 'one stop shop' for student queries covering:

- General advice and guidance
- Assignment receipt and collection
- Programme and module changes

- Receipt of claims for extenuating circumstances
- Enrolment support out of the main enrolment periods (Kedleston Road)
- Access to Learning Fund (ALF) Applications
- Assessment and issue of student car parking permits (Kedleston Road).

Enquiries concerning the general administration of the programme should in the first instance be directed to the Programme Leader. Specific points relating to a particular module should be directed to the appropriate Module Leader.

SECTION NINE: Employability

Details of University Employability support team and CDP commitments on programmes.

Continuous Professional Development (CPD)

As you are studying on a postgraduate programme of a vocational nature it is expected that you will have already reflected and fully considered the effect that your studies will have on your personal development. The onus of responsibility is placed upon you. At each stage of your programme you will be individually counselled as to your module choices and programme progression options. This counselling will take the form of a one-to-one discussion between you and your Personal Tutor to best evaluate the most appropriate module choices based on both your perceived academic strengths and interests and career aspirations. These sessions will also cover any personal tutoring needs.

For online study this role is split between the Online Learning Advisor (OLA) and the Personal Tutor. The OLA will support study and module choice, while the personal tutor will support CPD and academic development.

You will be encouraged to identify how aspects of the programme will both benefit your development and future practice. The programme has professional development through individual module components: industry links and case studies, study visits, conferences, regional professional bodies CPD courses, short placements, proposals, presentations and student delivery of seminar topics. The programme actively encourages you to fully participate in a developmental and reflective attitude towards an understanding of transferable skills and their potential for employment opportunities.

As you start on your professional career you will be required to continually develop your skills as technologies can become obsolete or be superseded. At masters level this is effectively the beginning of your Professional Development Plan (PDP) or CPD journey. It is embedded in the whole programme but is specifically studied in the following core modules

- Research Methods: Application and Evaluation (C)
- CPD and Strategic Management (D)
- Independent Scholarship (M)

SECTION TEN: Post Programme Opportunities

Post Programme Opportunities

Graduates from the programme will be well equipped to gain employment in the materials and additive manufacturing sectors or similarly technical and service organisations related to additive manufacturing in the UK and overseas. On completion, you will be able to make a significant contribution to organisational success and be equipped for a variety of management and leadership roles, especially in the advanced materials or manufacturing fields.

Further learning is not simply about learning how to do the current job, but should provide knowledge and understanding that is transferable. Learning should provide you with a systematic understanding, and a critical awareness of current problems and insights into subjects, some of which are at, or informed by, the forefront of their professional practice. This means that the programme of study has a clear objective in the world of work in that prepares you as a professional within industry.

When you graduate you may also decide to extend your studies by registering for PhDs in the advance materials or additive manufacturing field.

SECTION ELEVEN: External Links

Employer Links

The University continuously seeks to understand the industries that it is aiming to serve. We do this by maintaining close links with local industries, sector skills councils and professional bodies.

We educate a large number of part-time students and offer specialist short courses, consultancy and research. Examples of local contacts include Rolls Royce, Bombardier, EPM Composites, Pentaxia, Toyota, Costain, Zytex/Gibson Technologies and Jaguar-Land Rover. An Industrial Advisory Forum drawn from these industries and others across the College allows the University to keep our pulse on current developments and for these to inform the curriculum.

The University also has good links with a number of equipment manufacturers and suppliers, and in particular those which provide technologies relating to the content of the programme will be consulted and asked to input into the content of the curriculum.