

Course Specification

Published Date:	15-Sep-2020
Produced By:	Laura Clode
Status:	Validated

Core Information

Awarding Body / Institution:	University of Wolverhampton		
School / Institute:	School of Engineering		
Course Code(s):	MA026P01UV MA026P31UV	Full-time Part-time	12 Months 2 Years
Course Title:	MSc Additive Layer Manufacturing Technologies		
Hierarchy of Awards:	Master of Science Additive Layer Manufacturing Technologies Postgraduate Diploma Additive Layer Manufacturing Technologies Postgraduate Certificate Additive Layer Manufacturing Technologies Postgraduate Certificate Additive Layer Manufacturing Technologies University Statement of Credit University Statement of Credit		
Language of Study:	English		
Date of DAG approval:			
Last Review:	2018/9		
Course Specification valid from:	2018/9		
Course Specification valid to:	2024/5		

Academic Staff

Course Leader:	Dr Peter Wardle
Head of Department:	Dr Syed Hasan

Course Information

Location of Delivery:	University of Wolverhampton
Category of Partnership:	Not delivered in partnership
Teaching Institution:	University of Wolverhampton
Open / Closed Course:	This course is open to all suitably qualified candidates.

Entry Requirements:

Entry requirements are subject to regular review. The entry requirements applicable to a particular academic year will be published on the University website (and externally as appropriate e.g. UCAS)

Students should normally be educated to honours degree level, with a minimum of a 2.2, in Mechanical Engineering, technology or a closely related discipline.

RPL will be granted, if appropriate, as part of the admissions process and then ratified by the FSE RPL committee. All non-standard applicants to this course will be dealt with on a case-by-case basis. In this instance, substantial professional experience can substitute for graduate status.

All first-degree qualifications in General Engineering and Physical Sciences (B Eng and B Sc) will be considered.

Normal University of Wolverhampton criteria for English will apply to students admitted to this course. This being IELTS 6 minimum or equivalent

Distinctive Features of the Course:

The concept of rapid product development and Rapid Manufacture (RM) is the productionising of Rapid Prototyping (RP) methods that have pioneered Additive Layer Manufacturing (ALM) techniques for the last 5 to 10 years. The fact that Rolls Royce, Land Rover/Jaguar, Unilever, Airbus, Boeing, F1 Motorsport, Bentley Motors and Proctor and Gamble all use rapid manufacturing philosophies and technology vindicates the need to educate a wider audience to address the future need for engineers in this area.

The School of Engineering, through the adoption of key ALM technologies within this sector has had privileged insight into ALM. The Department has partnered EOS GmbH, a key technology supplier for ALM, through its world "e-manufacturing" forum and more recently through its "Additive Minds" educational academy. EOS GmbH have, in addition, endorsed the course and donated multiple seats of industrial software to complement the EOS GmbH hardware currently housed in the department's workshops on Telford campus

The main manufacturing ethos will be delivered in a practical manor to reflect current industrial practices using new and current materials designed for the ALM processes. This subject area of the award will be underpinned with the concept of design for ALM, through the use of ALM and validation methodologies.

New teaching facilities installed as part of a recent £10m investment at the University of Wolverhampton's Telford Innovation Campus will be used to meet the teaching and learning requirements of students on this MSc course. All the specialist equipment needed for the delivery of the course including metal based and polymer based ALM machines, 5 axis CNC machining centres, powder analysis equipment and measurement systems. These manufacturing processes are supported by a new advanced materials and composites manufacturing facility. The course will be underpinned by high quality teaching, highly experienced and qualified members of academic staff who are at the cutting-edge of research in their respective fields.

The course has been developed according to the UK Engineering Council's benchmark requirements for professional engineering, to ensure that our students enter the workforce with the broad expertise and relevant capabilities that employers' value.

Educational Aims of the Course:

The aim of this course is to ensure graduates will be able to deal with complex issues both systematically and creatively and make sound judgements associated with rapid product manufacture by means of existing, new and emerging manufacturing processes. The course aims to ensure that graduates will be able to demonstrate self-direction, originality of thought and are equipped with the appropriate knowledge to practise professionally and ethically in future employment roles. Thus, the course will:

- address industry's demand for graduates who can apply innovative product manufacturing solutions to promote the rapid and cost effective manufacture of discrete parts and tooling across the engineering sector
- develop the ability to research a range of subject areas within manufacturing, mechanical, materials science and engineering disciplines, underpinning the ability to act autonomously in planning and implementing tasks at a professional or equivalent level
- generate graduates capable of synthesising their detailed understanding of engineering design and related material science in order to offer confident justified solutions to complex, unpredictable and open ended situations.

A principal component of the course is the dissertation project, which is usually associated with current research activity or industrial consultancy in the School of Engineering, allowing students to gain substantial expertise in one specific area.

Intakes:

September
January

Major Source of Funding:

OTHER FUNDING

Tuition Fees:

Tuition fees are reviewed on an annual basis. The fees applicable to a particular academic year will be published on the University website.

Year	Status	Mode	Amount
2020/1	H	Full Time	£6400.00
2020/1	Overseas	Full Time	£13350.00
2020/1	H	Part Time	£3200.00

PSRB:

None

Course Structure:

January (Full-time)

Year 1

Module	Title	Credits	Period	Type
7ET014	Computational Fluid Dynamics (CFD) and Heat Transfer	20	INYR	Core
7ET020	Computer Aided and High Speed Machining Application	20	INYR	Core
7MA019	Quality Control and Part Validation	20	INYR	Core
7ET023	Dissertation	60	CRYRA	Core

January (Part-time)

Year 1

Module	Title	Credits	Period	Type
7ET014	Computational Fluid Dynamics (CFD) and Heat Transfer	20	INYR	Core
7MA019	Quality Control and Part Validation	20	INYR	Core

7ET022	Research Methods and Professional Skills	20	INYR	Core
7ET019	Rapid Manufacturing Applications	20	INYR	Core
7MA018	Advanced Materials and Manufacturing Processes	20	INYR	Core

7ET022	Research Methods and Professional Skills	20	INYR	Core
7ET019	Rapid Manufacturing Applications	20	INYR	Core

January (Part-time)

Year 2

Module	Title	Credits	Period	Type
7ET020	Computer Aided and High Speed Machining Application	20	INYR	Core
7ET023	Dissertation	60	CRYRA	Core

7MA018	Advanced Materials and Manufacturing Processes	20	INYR	Core
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September (Part-time)

Year 1

Module	Title	Credits	Period	Type
7ET022	Research Methods and Professional Skills	20	IN YR	Core
7ET019	Rapid Manufacturing Applications	20	IN YR	Core
7ET014	Computational Fluid Dynamics (CFD) and Heat Transfer	20	IN YR	Core
7MA019	Quality Control and Part Validation	20	IN YR	Core

September (Full-time)

Year 1

Module	Title	Credits	Period	Type
7ET022	Research Methods and Professional Skills	20	IN YR	Core
7ET019	Rapid Manufacturing Applications	20	IN YR	Core
7MA018	Advanced Materials and Manufacturing Processes	20	IN YR	Core
7ET014	Computational Fluid Dynamics (CFD) and Heat Transfer	20	IN YR	Core
7ET020	Computer Aided and High Speed Machining Application	20	IN YR	Core
7MA019	Quality Control and Part Validation	20	IN YR	Core
7ET023	Dissertation	60	CRYRA	Core

September (Part-time)

Year 2

Module	Title	Credits	Period	Type
7MA018	Advanced Materials and Manufacturing Processes	20	IN YR	Core
7ET020	Computer Aided and High Speed Machining Application	20	IN YR	Core
7ET023	Dissertation	60	CRYRA	Core

Please note: Optional modules might not run every year, the course team will decide on an annual basis which options will be running, based on student demand and academic factors, to create the best learning experience.

Learning, Teaching and Assessment

Academic Regulations Exemption:

N/A

Reference Points:

[UK Quality Code for Higher Education](#)

[Qualifications and Credit Frameworks](#)

[Subject Benchmark Statements](#)

[University Policies and Regulations](#)

[Accreditation of Higher Education Programmes \(AHEP\) – Engineering Council](#)

Equality Act (2010)

Learning Outcomes:

PGCert Course Learning Outcome 1 (PGCCL01)

Demonstrate a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of your academic discipline, field of study or area of professional practice with a conceptual understanding that enables the student: a) to evaluate critically current research and advanced scholarship in the discipline b) to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.

PGCert Course Learning Outcome 2 (PGCCL02)

Demonstrate a comprehensive understanding of techniques applicable to your own research or advanced scholarship and ability to continue to advance your knowledge and understanding, and to develop new skills to a high level.

PGCert Course Learning Outcome 3 (PGCCL03)

Demonstrate originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline.

PGCert Course Learning Outcome 4 (PGCCL04)

Ability to deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate your conclusions clearly to specialist and non-specialist audiences.

PGCert Course Learning Outcome 5 (PGCCL05)

Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.

PGCert Course Learning Outcome 6 (PGCCL06)

Demonstrate the qualities and transferable skills necessary for employment requiring: a) the exercise of initiative and personal responsibility b) decision-making in complex and unpredictable situations c) the independent learning ability required for continuing professional development.

PGDip Course Learning Outcome 1 (PGDCL01)

Demonstrate a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of your academic discipline, field of study or area of professional practice with a conceptual understanding that enables the student: a) to evaluate critically current research and advanced scholarship in the discipline b) to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.

PGDip Course Learning Outcome 2 (PGDCL02)

Demonstrate a comprehensive understanding of techniques applicable to your own research or advanced scholarship and ability to continue to advance your knowledge and understanding, and to develop new skills

to a high level.

PGDip Course Learning Outcome 3 (PGDCLO3)

Demonstrate originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline.

PGDip Course Learning Outcome 4 (PGDCLO4)

Ability to deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate your conclusions clearly to specialist and non-specialist audiences.

PGDip Course Learning Outcome 5 (PGDCLO5)

Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level.

PGDip Course Learning Outcome 6 (PGDCLO6)

Demonstrate the qualities and transferable skills necessary for employment requiring: a) the exercise of initiative and personal responsibility b) decision-making in complex and unpredictable situations c) the independent learning ability required for continuing professional development.

Masters Course Learning Outcome 1 (MACLO1)

The application of knowledge and comprehensive understanding of design for manufacture, the application of manufacturing processes and methodologies to complex engineering problems and demonstrate an integrated approach to design realisation with the ability to apply and adapt them in unfamiliar situations.

Masters Course Learning Outcome 2 (MACLO2)

The ability to apply fundamental knowledge to investigate unfamiliar complex problems within manufacturing and engineering related disciplines to include new emerging technologies and approaches in order to propose and evaluate a broad range of solutions, thereby, assessing their limitations.

Masters Course Learning Outcome 3 (MACLO3)

A comprehensive understanding of the relevant scientific principles to solve complex problems in the analysis and synthesis of manufacture, validation and materials engineering and the ability to evaluate them critically in order to apply them effectively, in industry and generally in engineering projects.

Masters Course Learning Outcome 4 (MACLO4)

The ability to exercise initiative and take personal responsibility for teams of engineers effectively and ethically addressing the prominent social, legal, environmental, commercial and enterprise issues surrounding current and emerging complex engineering challenges.

Masters Course Learning Outcome 5 (MACLO5)

The ability to collect and analyse research data and to use appropriate engineering analysis tools including software packages for the design, analysis and synthesis of complex mechanical engineering applications and critically evaluate and communicate the results with the ability to monitor and adjust a personal programme of work on an on-going basis.

Masters Course Learning Outcome 6 (MACLO6)

An advanced level knowledge and understanding of a wide range of engineering materials and components thereby facilitating the efficient realisation of viable mechanical engineering products and systems, taking account of a range of commercial and industrial constraints.

Overview of Assessment:

Module	Title	Course Learning Outcomes
7ET014	Computational Fluid Dynamics (CFD) and Heat Transfer	MACLO2, MACLO3, MACLO5, PGCCLO1, PGCCLO3, PGCCLO4, PGDCLO1, PGDCLO3, PGDCLO4
7ET019	Rapid Manufacturing Applications	MACLO1, MACLO2, MACLO3, MACLO5, MACLO6, PGCCLO2, PGCCLO3, PGCCLO5, PGDCLO2, PGDCLO3, PGDCLO5
7ET020	Computer Aided and High Speed Machining Application	MACLO1, MACLO2, MACLO5, MACLO6, PGCCLO2, PGCCLO5, PGDCLO2, PGDCLO5
7ET022	Research Methods and Professional Skills	MACLO2, MACLO5, PGCCLO1, PGCCLO2, PGCCLO5, PGCCLO6, PGDCLO1, PGDCLO2, PGDCLO5, PGDCLO6
7ET023	Dissertation	MACLO1, MACLO2, MACLO3, MACLO4, MACLO5, MACLO6
7MA018	Advanced Materials and Manufacturing Processes	MACLO2, MACLO3, MACLO4, MACLO5, MACLO6, PGCCLO1, PGCCLO4, PGDCLO1, PGDCLO4
7MA019	Quality Control and Part Validation	MACLO2, MACLO3, MACLO4, PGCCLO5, PGCCLO6, PGDCLO5, PGDCLO6

Teaching, Learning and Assessment:

You will have the opportunity to engage with a wide range of learning approaches during your studies. You will take part in lectures, seminars and laboratory exercises. Some of these will be more traditional whereas others will require you to undertake research before coming together to discuss technical issues with other students and academic staff. You will have seminars from industry practitioners where you can discuss your project ideas with them to gain real world insight into the problems you are trying to solve. You will have the opportunity to work in a range of dedicated facilities and interface with industrially ready machinery to develop practical skills and understand the link between the theory and practical implementation of integrated CAD, design for ALM, simulation and Finite Element Analysis (FEA) Techniques. You will develop solutions to meet real world problems/requirements and be able to present these to your peers, practitioners and third parties to obtain balanced and current feedback.

The assessment methods used with the programme are varied and will develop your transferable skills as well as your technical ability. The ability to plan, judge, communicate complex issues, solve problems logically, and develop original solutions, in appraising critically the work of others, and in managing your own learning are all significant contributors to determining your grade for a module.

Some modules on the course are assessed by a mixture of coursework and examination. The coursework is designed to assess practical skills and problem-solving ability whereas the examination will focus more on assessing knowledge and understanding. Some modules will be teaching practical applied skills and so may be assessed entirely by coursework which might include laboratory work, report writing and presentations.

The learning strategy will promote the transferable skills gained during the course. These will include project management, analytical thinking, process application and materials analysis allowing you to pursue a career in a number of manufacturing sectors. Where possible, you will be encouraged to undertake live industrial projects as part of your study, as this activity will assist those who may choose industrially based careers in research and development, design, or product development. In addition, the combination of materials knowledge, design capability and the understanding of applications for new and emerging technologies will provide you with a wide range of employment opportunities in technical/research environments across the world.

To further underpin the teaching and learning activity, research-led teaching activities will be a significant feature of this MSc course. Research within Engineering is currently being done in several areas including

Additive Layer Manufacture, Metal Cutting, Finite Element Analysis, and Design and Process Development; all these areas are fully represented in the MSc course proposed.

Assessment Methods:

At the University of Wolverhampton, a variety of modes of assessment will be used to support and test your learning and progress and to help you develop capabilities that are valued beyond your University studies and into your working life. Your course may include a variety of assessment activities:

Written examinations (including online examinations, open and closed book examinations and quizzes)
Coursework (for example, essays, reports, portfolios, project proposals and briefs, CVs, poster presentation)
Practical (for example, oral and video presentations, laboratory work, performances, practical skills assessment)

In the final year of your undergraduate degree, and at the end of your postgraduate degree, you are likely to be expected to write an extended piece of work or research, such as a dissertation or a practice-based piece of research.

Student Support:

General University support:

[University Learning Centres](#) are the key source of academic information for students. Learning Centres provide physical library resources (books, journal, DVDs etc.) and offer a range of study areas to allow students to study in the environment that suit them best: Social areas, quiet and silent areas. Learning Centres also provide access to wide range of online information sources, including eBooks, e-Journals and subject databases.

Learning Centres also provide students with academic skills support via the [Skills for Learning programme](#). Students on campus can attend workshops or ask for one-to-one help on a range of skills such as academic writing and referencing. Students can access a range of online skills material at: www.wlv.ac.uk/lib/skills

The [University Student Support website](#) offers advice on a variety of matters (careers, counselling, student union advice, etc.) Students can also access these services by booking appointment with the SU, careers, counselling services, etc.

Course Specific Support

Each student will be allocated a personal tutor and will be expected to make contact at regular periods throughout their study. In addition there is a course leader in place that will advise on day to day course matters that may arise.

University Learning Centres are the key source of academic information for students providing access to:

Physical library resources (books, journal, DVDs etc.). Study areas to allow students to study in the environment that suits them best: Social areas, quiet and silent areas. A wide range of online information sources, including eBooks, e-journals and subject databases. Academic skills support via the Skills for Learning programme. Students on campus can attend workshops or ask for one-to-one help on a range of skills such as academic writing and referencing. Dedicated Subject Pages to enable you to explore key online information sources that are recommended for their studies.

Leave of Absence: The University allows breaks in learning of up to two years and there is a process for applying for a leave of absence, which can be accessed through your e:Vision account. Initially you will need to apply for the leave of absence, which could be for medical, parental or personal reasons. A short-term absence, such as annual leave, must not be recorded as a break. The course leader will consider, and where appropriate agree, the leave of absence application. A return date will be identified and agreed for a suitable point in the programme. Additional course fees may be incurred as a result of a leave of absence and you are advised to discuss this with the Faculty Student Services team prior to application.

Employability in the Curriculum:

The aim of this course is to ensure graduates will be able to deal with complex issues both systematically and creatively and make sound judgements associated with rapid product manufacture by means of existing, new and emerging manufacturing processes. The course aims to ensure that graduates will be able to demonstrate self-direction, originality of thought and are equipped with the appropriate knowledge to practise professionally and ethically in future employment roles. Thus, the course will:

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THE UNIVERSITY OF OPPORTUNITY