Royal Agricultural University

Programme Specification

MSc AGRICULTURAL TECHNOLOGY AND INNOVATION

1) Programme Information

Quercus code	*ATSM*
Valid entry routes	MSc Agricultural Technology and Innovation MSc Agricultural Technology and Innovation with Placement Year[1]
Additional exit routes	Postgraduate Diploma Agricultural Technology and Innovation Postgraduate Certificate Agricultural Technology
Location(s) of Study	Royal Agricultural University, Cirencester Campus with some visits or case study demonstrations off site.
School	Agriculture, Food and Environment
Programme Manager	Dr Kat Giebel
Awarding Body	The Royal Agricultural University
Teaching Institution	The Royal Agricultural University
Academic level on Framework for Higher Education Qualifications (FHEQ)	Level 7
Admissions Body	The Royal Agricultural University
UCAS code(s)	N/A
Entry Criteria (include IELTS if relevant)	Honours degree at upper second level. Mature candidates with significant relevant work experience and lower academic qualifications may also be considered for entry, following interview with the course manager. IELTS: For students whose first language is not English, the University will accept International English Language Test (IELTS) with a minimum overall score of 6.5 average with no element below 5.5.

[1] Students who enrol on the variant of the Programme with Placement Year follow the same programme as other student but there is an additional requirement to complete the 60 credit PGPPY, information specifically for those students is included within this document but annotated with: **'PY'**.

	Students with other qualifications, including overseas awards and alternative English language qualifications, are advised to contact Admissions to discuss the suitability of their award
Relevant QAA Subject Benchmark Statement(s) and other reference points, e.g. FD qualification benchmark	https://www.qaa.ac.uk/quality-code/subject-benchmark-statements Subject Benchmark Statement Agriculture, Horticulture, Forestry, Food, Nutrition and Consumer Sciences October 2019
Details of accreditation by a Professional, Statutory and Regulatory Body (PSRB)	
Mode of delivery	Full-time or part-time
Language of study	English
Programme Start Month(s)	September and January
Academic Board approval date	2nd June 2021
Valid from	Date of validation/re-validation

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Valid to	August 2028
Version	V2.1 – July2021 *[module codes updated]*

2) <u>What are the aims and objectives of the programme?</u>

The aims and objectives of the programme are to support the RAU's: **Vision**, *A world where all communities thrive in harmony with nature*; **Mission**, *Equipping a new generation to thrive through change*; and **Purpose**, *To cultivate care for the land and all who depend on it*. The MSc Agricultural Technology and Innovation programme benefits from research-led teaching from key members of the following RAU's research groups: S*ustainable and regenerative agriculture, Livestock health and welfare, Food safety, quality and security, Environment and soil health*

Advances in the agricultural sector, and the way in which growers are now changing their mentality to crops growth, has created a growing demand for new intellectual and technological skill set. Developments in sensors, robotics, automation, analytics and telematics are enabling new and sophisticated ways of managing agricultural practices.

Precision agriculture technology and the "Digital Ag age" is swiftly gaining popularity among UK farmers as well as the world's farming community and its primary producers; due to the increasing need of optimum production with the given resources. The need for adoption of these new and innovative systems have been developed over the recent decades to help mitigate the changing weather patterns due to increasing global warming, and so, have necessitated the adoption of advanced technologies to enhance the productivity and crop yield.

These technologies such as real-time farm monitoring, weather forecasting, optimal field requirements and other innovative technologies enable growers to increase the yield with minimum human efforts and wastage. Moreover, the technology enables the farmers to manage their resources as well as access real time information through their smartphones, thereby offering greater mobility and ease of operation. However, major restraints of the market are affordability and accessibility of the technology, and lack of awareness about the benefits of precision agriculture among farmers, particularly in the developing countries.

There are escalating issues over the sustainable supply of production resources such as water, soil and fertilisers. Increased precision and more adaptable management of these has the potential to make a positive contribution in conserving such essential inputs, whilst minimising the expenditure of carbon The capture of environmental data and its rapid and accurate interpretation may also provide opportunities for more effective and timely management of natural land, wild and undeveloped area.

The combination of scale and precision will reduce the requirements of unskilled labour and will increase the demand for highly skilled specialists in the field of digital agriculture. Forward looking businesses will be in need of talented, well-educated and skilful recruits capable of making effective contributions to business projects from the outset of their careers.

This course is suitable for students from a variety of academic and professional backgrounds, including agriculture, business management, engineering/agricultural engineering or software development.

The aims of this programme are to produce graduates that

- Have a comprehensive understanding of the new and innovative technologies being applied in sustainable agriculture and for the sustainable management of the natural environment.
- Have the ability to use their knowledge and skills to develop innovative solutions to novel problems, generate new ideas, and develop innovative new technologies and adapt and update established methods, techniques and procedures.
- Are technically adept, accomplished, and fluent with technical aspects of the capture, processing, interpretation and application of digital data.
- Have an understanding of the principles and practice of agricultural and horticultural production and a full awareness of the potential applications and benefits of new technologies.

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- Have an applied management, enterprise and entrepreneur skill set in a range of agricultural technology systems contexts
- Are able to communicate in appropriate ways at all levels, and to clearly and effectively present concepts and research findings to interested individuals, groups, businesses and other commercial organisations, and government agencies and institutions.
- Are committed to the improvement of agriculture, horticulture, and the care of the natural environment.
- Are responsible and considerate of the ethical issues in their work.
- Are competent researchers with the ability of research planning and design, synthesis and critical analysis
- Are lifelong learners, with motivation to sustain their personal, professional and career development

3) What opportunities are graduates likely to have on completing the programme?

A combination of a comprehensive appreciation of the wide range of new and innovative technologies in digital agriculture together with an understanding of the demands of commerce and business will ensure graduates of this course are fully equipped to make effective contributions to the field of digital agriculture. Graduates are likely to be in demand as new companies form and established organisations and enterprises move into this new and dynamic sector.

This course is designed to allow graduates to develop their skills and abilities to a level commensurate with starting a career across a range of opportunities and obtain employment in:

- The high-tech agricultural and environmental sectors
- Industries allied to crop and animal production
- Technical consultancy
- Government and international agencies
- The development of new companies through entrepreneurial initiatives
- Research institutions

Potential employment opportunities include:

- Agricultural and horticultural engineering
- Information technology
- Resource appraisal
- Agronomy
- Farm management

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The course has a strong academic foundation, including a period of independent study that provides an opportunity to engage with sector specialists in a professional capacity.

The course has a well-qualified team involved in its delivery, with academic excellence and strong industry contributions from experienced leaders from a variety of agri-technology based businesses.

4) What should students expect to achieve in completing the programme?

Programme Intended Learning Outcomes

A: Knowledge and understanding

A1 Understand and differentiate between types of agricultural production systems (both large- and small-scale) and critically evaluate their contribution to sustainable agriculture.

A2 Explain, appraise and critically evaluate a range of technical systems, devices and innovations used in digital agriculture related to livestock and crop production.

A3 Explain, appraise and critically evaluate a range of environmental technologies and innovative practices used for the sustainable management of the environment and natural resources and understand the impact of climate change on natural resources

A4 Recognise how existing and new devices and technologies in an agricultural context can be used to collect and use data to aid farm/agricultural business operations and management

A5 Understand the role of entrepreneurs in the creation of business ventures and recognise, assess and articulate start up opportunities using a business plan and pitch.

A6 Critically evaluate and analyse agricultural technology products and systems with respect to a range of management requirements

A7 Create and assess hardware and software and obtain an understanding how IT professionals design and build technology

B: Intellectual, Professional, Key skills

B8 Develop lifelong skills which enable the synthesis and critical analysis of data and information from a wide range of sources to support and evaluate solutions to practical and real world problems

B9 Show creativity and manage the creative process

B10 Identify and solve complex problems holistically by evaluating issues and options, and implementing and reviewing decisions

B11 Devise and sustain an argument supported by valid and significant evidence.

B12 To manage time and resources appropriately in both individual and team situations to enable successful project delivery

B13 Citing and referencing sources of data and information with academic integrity in an appropriate manner whilst ensuring the avoidance of plagiarism.

C: Programme Specific Skills

C14 To undertake project management for agricultural technology and innovation assessments, analyse and report results effectively and appropriately

C15 To communicate through a variety of mediums on topics relating to agricultural technology and innovation to wide range of audiences

C16 Conduct research into digital agriculture and agricultural technology systems and management issues either individually or as part of a team through research design, hypothesis creation, data collection, analysis, synthesis and reporting

C17 To understand the role of self-reflection and critical analysis in one's own personal attributes for a range of situations including resilience, open-mindedness, reflection, motivation, professional behaviours, and employability.

5) How is the Teaching and Learning delivered in this programme?

This programme is primarily delivered face-to-face on the RAU Cirencester campus and will also incorporate some elements of online learning. Teaching approaches are supported by a range of learning materials and activities presented on the RAU VLE. The programme is available over 1-year full time or 2 years part-time. There are two entry point, the start of semester 1 (September) and the start of semester 2 (January). September starters will complete the MSc after 12 months of full-time study and January starters will complete the MSc after 15 month of full-time study to allow for the completion of a research project.

Students may choose to exit the programme earlier and obtain either a Postgraduate Diploma (Accumulation of 120 credits through successful completion of 8 taught modules without the dissertation) or a Postgraduate Certificate (Accumulation of 60 credits through successful completion of any 4 taught core modules).

The delivery is through a combination of lectures, seminars, speakers, case studies, workshops and with activities presented through the Virtual Learning Environment (VLE) which is also used to host other supporting material including videos, webinars, quizzes, podcasts and other relevant presentations.

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Teaching will include group discussions, tutorials, facilitated discussions, workshops, guided independent study and a research project. Assessment will be a balance between individual and group work and will consist of a range of critical reports, written examinations, poster presentations, oral presentations, critical reflections and dissertation / applied project.

Each module is supported by a comprehensive resources list that is maintained through the RAU Library Talis system.

6) What is the Programme Assessment Strategy?

Module learning outcomes are assessed by a wide range of methods (see below). Using a range of assessment methods gives students more latitude to demonstrate their knowledge and skills across a range of contexts. By adopting a wider repertoire of assessments, learners who may for one reason or another be disadvantaged by the extensive use of particular assessment formats, will not be disadvantaged.

	Module code	Assessment 1	%	Assessment 2	%
Integrated Agricultural Systems	4038a	Group case study	50	2 hour unseen exam	50
Computing and IT in Precision Agriculture	4233	Portfolio	100		
Livestock production technology and innovation	4726	Technical report	80	Exam	20
Environmental Technology and Innovation	4725	Technical report	70	Academic poster	30
Crop Production Technology and Innovation	4723	Critical evaluation report	70	Presentation	30
Entrepreneurship and Business Planning	4263	Individual pitch	40	Business plan	60
Research skills	4413	Research proposal	50	Reflective piece	50
Dissertation (45 credits)	Either 4414	Dissertation	100		
Applied project (45 credits)	Or 4415	Applied project	90	Reflective report	10
Postgraduate Professional Placement Year[PY]	PGPPY	Portfolio	100		
Electives					
Climate Change and Sustainability	4722	Coursework report	100		
Small Scale Farming and Local Food Supply	4203	Report on policy development	60	Case study	40
Environmental Science in Agriculture	4724	Report	100		
Managing Global Soils in a Changing Climate	4727	Individual report	100		

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Facing the Global Challenges in Food and Agriculture	4409	Critical policy analysis	100		
Leadership and personal development	4261	Collaborative group exercise	25	Reflection on e-portfolio	75

7) **What do students need to achieve in order to graduate?**

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the programme, as laid out in Section 7. Programmes are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualification of:

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The accumulation of 180 credits (or more) to include a minimum of 150 at level 7 (of which at least 60 must be achieved from research focused modules: either Masters dissertation or agreed equivalent research-based project or a combination of a research methods module and a Masters dissertation or agreed relevant research-based project).

	Description	Credits
	Core	
4038a	Integrated Agricultural Systems	15
4233	Computing and IT In Precision Agriculture	15
4726	Livestock Production Technology And Innovation	15
4725	Environmental Technology And Innovation	15
4723	Crop Production Technology And Innovation	15
4263	Entrepreneurship and Business Planning	15
4413	Research Skills	15
Either 4414	Dissertation (45 credits)	45
Or 4415	Applied project (45 credits)	45
	Plus 2 electives from:	
4727	Managing Global Soils in a Changing Climate	15
4409	Facing the Global Challenges in Food and Agriculture	15
4722	Climate Change and Sustainability	15
4203	Small Scale Farming and Local Food Supply	15
4724	Environmental Science in Agriculture	15
4261	Leadership and Personal development	15
	Total credits	**180**

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The accumulation of 240 credits (or more) to include a minimum of 150 at level 7 (of which at least 60 must be achieved from research focused modules: either Masters dissertation or agreed equivalent research-based project or a combination of a research methods module and a Masters dissertation or agreed relevant research-based project).

	Description	Credits
	Core	
4038a	Integrated Agricultural Systems	15
4233	Computing and IT In Precision Agriculture	15
4726	Livestock Production Technology And Innovation	15
4725	Environmental Technology And Innovation	15
4723	Crop Production Technology And Innovation	15
4263	Entrepreneurship and Business Planning	15
4413	Research Skills	15
Either 4414	Dissertation (45 credits)	45
Or 4415	Applied project (45 credits)	45
PGPPY	Postgraduate Professional Placement Year	60
	Plus 2 electives from:	
4727	Managing Global Soils in a Changing Climate	15
4409	Facing the Global Challenges in Food and Agriculture	15
4722	Climate Change and Sustainability	15
4203	Small Scale Farming and Local Food Supply	15
4724	Environmental Science in Agriculture	15
4261	Leadership and Personal development	15
	Total credits	**240**

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the RAU Academic Regulations; (paragraphs 137 – 153).

Programme Intended Learning Outcomes (ILO) Chart

How assessments from the modules directly assess the Award/Programme Los:

Title of Award: MSc in Agricultural Technology and Innovation

Module Code.	Knowledge and Understanding							Intellectual/Professional/Key Skills						Programme Specific Skills			
Award ILOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
4038a/b	EX							CW	CW			CW			CW		
4233							CW		CW	CW		CW					
4726		EX/CW		EX		CW					CW	CW	CW				
4725			CW	CW		CW		CW			CW	CW	CW		CW		
4723		CW	CW			CW		CW	CW		CW	CW	CW	CW	CW		
4263					CW			CW	CW	CW		CW			CW		CW
4413								CW			CW	CW	CW			CW	CW
4414								CW	CW	CW	CW	CW	CW	CW		CW	
4415								CW	CW	CW	CW	CW	CW	CW		CW	
4203		CW		CW		CW		CW			CW	CW	CW	CW			
4261				CW					CW	CW	CW	CW	CW		CW		CW
4409	CW		CW					CW			CW	CW	CW				CW
4727	CW		CW					CW		CW	CW	CW	CW	CW			
4722			CW					CW		CW	CW	CW	CW				
4724	CW							CW		CW	CW	CW	CW				

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8) Work-based Learning

Those who enrol on the Placement Year variant of the programme are required to undertake the 60 credit, Level 7, Postgraduate Professional Placement Year module. This is designed to enable students to complete a relevant enhanced work placement experience to help form future career choices and to provide the opportunity to acquire relevant skills sets sought by employers through engaging in various aspects of the chosen industry from an operational to practical working setting. The module spans an entire academic year and is taken after completing the taught element of the programme at L7, before embarking on the dissertation.

9) How will the University assure the quality of the provision?

New programme proposals are reviewed by a Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the QAA's UK Quality Code. All programmes are ultimately approved by Academic Board for a period of up to 6 years.

Programme changes within a validation period are approved by the Academic Quality and Standards Committee (AQSC) on behalf of Academic Board. No more than 1/3 of a programme's core modules may be changed within the validation period before early programme revalidation is instigated.

The University has in place regular monitoring procedures for quality assurance including an Annual Programme Managers Report for each programme.

Each programme has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the advice and guidance provided by the QAA regarding External Expertise which emphasises that external examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each programme has a formally constituted Programme Board, which includes the External Examiner(s), and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Learning Outcomes of a programme at the appropriate standard.

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Each programme has a Programme Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each School has a School Advisory Group (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of the School programme portfolio content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition the University's holds Staff Student Liaison Committees and a Student Experience Committee where students have the opportunity to discuss issues and give and receive feedback. Students are also invited to participate in the University's New Student Survey and Student Satisfaction Survey along with the annual National Student Survey. The results of all feedback are considered by the Programme Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by AQSC, Academic Board, School and University Executives.