

# COURSE SPECIFICATIONS

<b>Course Aim and Title</b>	MSc Robotic Construction
<b>Intermediate Awards Available</b>	PG Cert Robotic Construction PGDip Robotic Construction
<b>Teaching Institution(s)</b>	UEL on campus
<b>Alternative Teaching Institutions</b> (for local arrangements see final section of this specification)	NA
<b>UEL Academic School</b>	Architecture, Computing and Engineering
<b>UCAS Code</b>	NA
<b>Professional Body Accreditation</b>	N.A.
<b>Relevant QAA Benchmark Statements</b>	Informed by Land, Construction, Real Estate and surveying (October 2019)
<b>Additional Versions of this Course</b>	MSc Robotic Construction with Industrial Placement
<b>Date Specification Last Updated</b>	February 2022

## Course Aims and Learning Outcomes

Digital technologies have altered the field of architecture, construction and engineering and the built environment profession significantly – from design to production. Utilising our in-house state of the art 7th generation robotic arm, the MSc in Robotic Construction seeks to train a new generation of interdisciplinary professionals who are capable of facing growing need for a more sustainable and optimised construction eco-system. In this context, the course combines core elements of construction technology along with the theory and practice behind some of the latest digital developments in the field. The dissertation and research methods module will also allow you to develop deeper knowledge of robotics and automation in construction areas of particular interest to you. The course will also offer an optional placement, enabling you to experience real world practice and to connect your University experience with this.

This course is designed to enable you to:

- Demonstrate comprehensive understanding of computational design and advanced modelling within the built environment/ construction discipline.
- Gain extensive knowledge and understanding of the most up to date methodologies and strategies

in the area of automated and robotic construction engineering.

- Demonstrate the subset of industrial robots and manufacturing related units which are used for construction and building to enable ease and accuracy of construction work. This could be in line with digital technology which can enhance the delivery of construction projects.
- Understand key technical parameters associated with design computation, digital fabrication and robotic manufacturing
- Develop management skills and be critically reflective whilst completing a significant research project.
- Develop techniques for analysing and solving real-world problems and act autonomously in planning and implementing tasks at a professional level with a clear understanding of the theories and practice in the subject area of automated and robotic construction.

What you will learn:

### **Knowledge**

- Proficiency in communicating ideas to a technical and non- technical audience.
- Critical thinking and problem solving in a structured logical way.
- Identification and application of appropriate theoretical frameworks for the built environment sector.
- Appreciate standard terminologies and key principles used in the subject area of automated and robotic construction.

### **Thinking skills**

- Critical thinking, evaluation of knowledge and self-reflection.
- Systematic analysis of problems and implementation of their effective solutions.
- Critical awareness of the issues and challenges involved in emerging areas of automated and robotic construction.

### **Subject-Based Practical skills**

- Application and examination of different methods of construction with the integration of automated and robotic construction principles. This is in the area of delivering projects by introducing advanced construction and fabrication processes and advanced modeling.
- Evaluation of different findings and results for effective automated construction.
- Demonstration and evaluation of computer-aided methods for construction and fabrication processes.
- Analysis of different digital solutions, strategies, planning, skills and abilities, essential for automated/ robotic construction.

### **Skills for life and work (general skills)**

- Interpersonal skills and the ability to work effectively in a team.
- The ability to implement digital solutions for carrying out robotic construction projects.
- The ability to meet deadline delivery under tight conditions.
- The ability to undertake complex problems and develop appropriate solutions whilst managing robotic construction projects.

## **Learning and Teaching**

The course is supported by an integrated teaching, learning and assessment strategy that demonstrates the appropriateness of the learning, teaching and assessment methods used in relation to the intended learning outcomes. The following methods are adopted:

- Lectures
- Tutorials

- Coursework assignments
- Seminars
- Textbooks, journal papers, electronic databases and other self-study and e- learning materials
- Project work
- Sessions and learning through case studies

Use of coursework will strengthen the learning strategy by providing opportunities for the students to enhance their critical thinking skills and to evaluate different solutions and adjust their plans in a changing environment. The aim is to enable them to deal the evolving and open-ended nature of construction projects in the “real world”. The coursework assignments will require creativity, judgement, application of knowledge acquired during their course.

The research skills and dissertation module is designed to provide the opportunity and challenge to develop a thorough understanding of a particular problem. Students collect data and carry out background research on state-of-the-art approaches to help devise suitable solutions and to draw and communicate conclusions. This module is instrumental in developing critical judgement and independent thought.

Knowledge is developed through:

- Guided reading
- Knowledge-based activities with feedback

Thinking skills are developed through:

- Reflective activities with feedback

Practical skills are developed through:

- Practical activities with feedback
- Research skills-based activities with feedback

Skills for life and work (general skills) are developed through:

- The demands of the study medium
- Planning activities with feedback
- Project work

In addition, the optional industrial placement provides opportunities to apply key technical knowledge and skills learnt in the taught modules, enhance students’ communication and interpersonal skills and improve their employment potential.

## **Assessment**

To reflect the course objectives and learning outcomes each taught module is assessed through a combination of assessment techniques. These include group and individual work, written reports and essays. The project module is assessed through a research proposal and dissertation.

The following assessment methods are adopted:

- |                                   |                            |
|-----------------------------------|----------------------------|
| > Coursework                      | > Presentation             |
| > Research dissertation           | > Evaluation of literature |
| > Solutions to practical problems | > Seminars                 |
| > Use of design models            | > Use of design aids       |
| > Use of computer aided packages  |                            |

Students with disabilities and/or particular learning needs should discuss assessments with the course leader to ensure they are able to fully engage with all assessment within the course.

## Work or Study Placements

Students on the placement version of the course will undertake a placement within a partner organisation (or by means of alternative arrangements such as projects led by industry and carried out on campus) to complete a 120 P-credit industrial placement module. The module is graded at either Pass or Fail, assessed by the partner industrial organisation and the university and grades reflected on the students' academic transcripts.

The industrial placement component is for a duration of an academic year, i.e., normally 30 weeks including minimum 24 weeks of delivery time. It starts after students have completed the 1<sup>st</sup> year of study, i.e., all the taught modules and the dissertation component of the MSc course which together form 180 credits.

Students on the two-year MSc with placement courses must pass all taught modules of their respective course plus dissertation, i.e., 180 credits, before they become eligible to progress to the next stage and undertake industrial placement.

Students on the MSc course with placement will also normally be required to fulfil the 80% attendance requirement (on all modules) to be eligible to progress to the industrial placement module.

Students unable to meet the above requirements and progress successfully will normally be moved to the one-year full-time version of the course and their student visa, if any, will be curtailed accordingly.

The structure of the extended version of the MSc courses that includes the industrial placement is summarised in the following table:

<b>For September intake:</b> Term 1 (Y1: Sep – Jan) Term 2 (Y1: Jan – May) Term 3 (Y1: May – Sep) End of July Y1 Term 1 and 2 (Y2: Sep – May)	Taught modules Taught modules Dissertation Deadline for confirming placement Industrial placement
<b>For January intake:</b> Term 2 (Y1: Jan – May) Term 1 (Y1: Sep – Jan) End of March Term 3 and 1 (Y2: May – Jan)	Taught modules Taught modules Dissertation Deadline for confirming placement Industrial placement
<b>For May intake:</b> Term 3 (Y1: May- Sep) Term 1 (Y1: Sep – Jan) Term 2 (Y1: Jan – May) End of March Term 3 and 1 (Y2: May – Jan)	Taught modules Taught modules Dissertation Deadline for confirming placement Industrial placement

Students must check the Academic Calendar for start and end of term dates.

It is ultimately the student's responsibility to secure their placement. The University will offer guidance and support; and recommend students to our industrial partners who are interested in participating in the course. But the onus to find and secure the placement is on the students. If they are unable to secure a placement at the end of taught modules, they will be transferred back to the full-time taught course without the placement component and your student visa, if applicable, will be curtailed accordingly by UKVI.

Students undertaking the Placement Module will also normally need to meet the following requirements:

- 80% attendance at the 12-week employability module workshops and classes.
- Registration on the UEL Employment Hub with CV and Covering Letter uploaded.
- Details of placement provided to the Placement Officer by 31<sup>st</sup> July (Sept starters) and 31<sup>st</sup> March (January/ May starters).

- Placement Agreement form signed by the student and partner organisation at least 3 weeks before the placement start date.

## **Course Structure**

All courses are credit-rated to help you to understand the amount and level of study that is needed.

One credit is equal to 10 hours of directed study time (this includes everything you do e.g. lecture, seminar and private study).

Credits are assigned to one of 5 levels:

- 3 Equivalent in standard to GCE 'A' level and is intended to prepare students for year one of an undergraduate degree course.
- 4 Equivalent in standard to the first year of a full-time undergraduate degree course.
- 5 Equivalent in standard to the second year of a full-time undergraduate degree course.
- 6 Equivalent in standard to the third year of a full-time undergraduate degree course.
- 7 Equivalent in standard to a Masters degree.

Courses are made up of modules that are each credit weighted. The module structure of this course:

<b>Level</b>	<b>Module Code</b>	<b>Module Title</b>	<b>Credit Weighting</b>	<b>Core/ Option</b>	<b>Available by Distance Learning? Y/N</b>
7	EG7034	Mental Wealth: Professional Life (Engineering Management)	30	Core	N
7	EG7028	Robotic construction and Integrative technologies	30	Core	N
7	EG7037	Environmentally Sustainable Engineering and Logistics	30	Core	N
7	EG7026	Digital design techniques	30	Core	N
7	EG7020	Research Skills and Dissertation	60	Core	N
7	EG7021	Industrial Placement	120P	Core for MSc with industrial placement only	N

A core module for a course is a module which a student must have passed (i.e. been awarded credit) in order to achieve the relevant named award. An optional module for a course is a module selected from a range of modules available on the course.

The overall credit-rating of this course (not including the industrial placement) is 180 credits. If for some reason you are unable to achieve this credit you may be entitled to an intermediate award, the level of the award will depend on the amount of credit you have accumulated. You can read the University Student Policies and Regulations on the UEL website.

### **Course Specific Regulations**

None

### **Typical Duration**

For those not on a student visa, it is possible to move from full-time to part-time study and vice-versa to accommodate any external factors such as financial constraints or domestic commitments. Many of our students make use of this flexibility and this may impact on the overall duration of their study period.

#### *Course without industrial placement*

The duration of this course is one calendar year full-time if enrolment is in September or May, and two calendar years part-time. For January enrolment, the duration becomes 15 months full time, and 27 months part-time. The full-time structure is summarised in the following Table:

<p><b>For September intake:</b> Term 1 (Y1: Sep – Jan) Term 2 (Y1: Jan – May) Term 3 (Y1: May – Sep)</p>	<p>Taught modules Taught modules Dissertation</p>
<p><b>For January intake:</b> Term 2 (Y1: Jan – May) Term 1 (Y1: Sep – Jan) Term 2 (Y2: Jan – May)</p>	<p>Taught modules Taught modules Dissertation</p>
<p><b>For May intake:</b> Term 3 (Y1: May- Sep) Term 1 (Y1: Sep – Jan) Term 2 (Y1: Jan – May)</p>	<p>Taught modules Taught modules Dissertation</p>

#### *Course with industrial placement*

The course with industrial placement is offered in full-time mode only. The duration of this course is two academic years (including the industrial placement element). See “Work or Study Placements” section for more detail. The time limit for completion of a course is four years after first enrolment on the course.

## **Further Information**

More information about this course is available from:

- The UEL web site ([www.uel.ac.uk](http://www.uel.ac.uk))
- The course handbook
- Module study guides
- UEL Manual of General Regulations (available on the UEL website)
- UEL Quality Manual (available on the UEL website)
- School web pages

All UEL courses are subject to thorough course approval procedures before we allow them to commence. We also constantly monitor, review and enhance our courses by listening to student and employer views and the views of external examiners and advisors.

## **Additional costs**

*Required:* Students will be required to purchase their own Personal Protective Equipment (PPE) for planned visits to an industrial or construction sites. These will be announced at the beginning of every semester. This will be in the range of £150-200 (est.). Students are also expected to have their own personal computing equipment as well (£400 upwards).

Alternative Locations of Delivery: N/A