Course Specification

Published Date: 15-Aug-2017

Produced By: Haiden Novis

Status: Validated

Core Information

Awarding Body / Institution: University of Wolverhampton

School / Institute: School of Engineering

Course Code(s): MA008H01UV
          MA008H31UV

Course Title: BEng (Hons) Mechatronics Engineering

Hierarchy of Awards: Bachelor of Engineering with Honours Mechatronics
          Bachelor of Engineering Mechatronics
          Diploma of Higher Education Mechatronics
          Certificate of Higher Education Engineering
          University Statement of Credit

Language of Study: English

Date of DAG approval: 24/May/2017

Last Review: 2014/5

Course Specification valid from: 2014/5

Course Specification valid to: 2020/1

Academic Staff

Course Leader: Dr Ahmad Zakeri

Head of Department: Dr Syed Hasan
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 2017 Entry)

2017 Entry

- A Level minimum of BB or CDD to include Mathematics and a Technology or Science based-subject
- BTEC National Diploma grade MMP, BTEC National Certificate grade DM
- BTEC QCF Extended Diploma grade MMP, BTEC QCF Diploma grade DM
- Applicants will normally be expected to hold GCSE English and Maths at grade C+/4 or equivalent
- Applicants holding/studying an Access to HE Diploma may be considered on an individual basis.
- If you've got other qualifications or relevant experience, please contact The Gateway for further advice before applying.
- International entry requirements and application guidance can be found here

- Successful completion of the BSc(Hons) Science and Engineering with Foundation Year guarantees entry on to this course
- Successful completion of the International Foundation Year in Science and Engineering guarantees entry on to this course

Other Requirements

Students must have studied a minimum of two years post GCSE level. However, it is expected that some applicants will be mature students with work experience, who wish to further their career development. These applicants will be processed through standard procedures, which may involve an interview as part of the process. Please see http://wlv.ac.uk/mature for further information.

Those who do not meet the entry requirements may be offered an alternative course.

Distinctive Features of the Course:

The Department of Engineering and Technology specialises in the integration of the mechanical engineering and electrical/electronic engineering disciplines. The BEng Mechatronics course reflects this emphasis and, in addition to gaining in-depth knowledge and understanding of the mechanical engineering subject, students also gain experience of designing engineering systems that incorporate aspects of the mechanical and electrical/electronic technologies.

You will be using industry-standard software. In addition to experimental work at the University you will use Radar equipment at the Cosford Royal Air Force base - the same equipment used to train Air Force personnel.

You will be taught by lecturers who have a wealth of industrial experience in an environment focused on working with, and supporting engineering and technology companies.

The BEng (Hons) Mechatronics course is one of a small number of accredited courses that you can undertake as either a full-time or part-time (day-release) student, thus providing all graduates with equal recognition.

Educational Aims of the Course:
The overall aim of this course is to ensure graduates have a comprehensive engineering education combined with specialist knowledge of mechatronic engineering recognised in the professional engineering community by an accredited degree. This ensures that graduates are equipped with the appropriate knowledge and enterprising spirit to practise professionally and ethically. Thus, the course will:

- address industry's demand for graduates who can integrate the principles and applications mechatronics engineering, and apply them to the analysis and synthesis of engineering products and systems across the engineering sector
- enable students to pursue professional careers in the mechatronics engineering field at a level which requires the exercise of sound judgement, and initiative, and the ability to make informed decisions in complex and unpredictable circumstances that reflect a responsible, ethical, and socially aware outlook
- furnish students with a detailed understanding of the principles of electrical engineering, electronics and mechanical engineering science, enabling the rational selection of the most appropriate approach to solve engineering problems
- engender a top-down, systems approach to the analysis, synthesis and realisation of mechatronic products and systems
- provide a broadly based education in electrical engineering, electronics and mechanical engineering and design allowing scope for entry into a wide range of disciplines within the engineering field
- require students to participate in a group project where the project team members are drawn from a range of cognate engineering disciplines
- develop the ability to research unfamiliar subject areas in mechatronic engineering and cognate disciplines, thereby enhancing the creative aspects of engineering design and innovation
- require the application of the knowledge and skills, in an appropriate industrial environment, thereby broadening the student's knowledge of industrial procedures and practices.

Intakes:

September

Major Source of Funding:

HE FUNDING COUNCIL FOR ENGLAND (HEFCE)

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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Status</th>
<th>Mode</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/8</td>
<td>H</td>
<td>Full Time / Sandwich</td>
<td>£9250.00</td>
</tr>
<tr>
<td>2017/8</td>
<td>EU</td>
<td>Full Time / Sandwich</td>
<td>£9250.00</td>
</tr>
<tr>
<td>2017/8</td>
<td>Overseas</td>
<td>Full Time / Sandwich</td>
<td>£11475.00</td>
</tr>
<tr>
<td>2017/8</td>
<td>H</td>
<td>Part Time</td>
<td>£2835.00</td>
</tr>
<tr>
<td>2017/8</td>
<td>EU</td>
<td>Part Time</td>
<td>£2835.00</td>
</tr>
<tr>
<td>2017/8</td>
<td>Overseas</td>
<td>Part Time</td>
<td>£5738.00</td>
</tr>
</tbody>
</table>
PSRB:

None

Course Structure:

**September (Full-Time)**

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Credits</th>
<th>Period</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>4MA007</td>
<td>Engineering Mathematics</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>4MA008</td>
<td>Engineering Science</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>4MA017</td>
<td>Mechanical Engineering Principles</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>4MA020</td>
<td>Electronic Engineering</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>4MA021</td>
<td>Applied Engineering</td>
<td>40</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>5MA013</td>
<td>Thermodynamics and Fluids</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>5MA019</td>
<td>Signal Processing I</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>5MA021</td>
<td>Analogue and Digital Electronic Engineering</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>5MA023</td>
<td>Control Systems</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>5MA020</td>
<td>Embedded Systems Design</td>
<td>40</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>5MA016</td>
<td>Industrial Placement</td>
<td>40</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>6MA011</td>
<td>ESEE: Economic, Social, Ethical and Environmental</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>6MA021</td>
<td>Signal Processing II</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>6MA025</td>
<td>Mechatronic System Design</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>6MA026</td>
<td>Control Engineering I</td>
<td>20</td>
<td>YEAR</td>
<td>Core</td>
</tr>
<tr>
<td>6MA017</td>
<td>Individual Research Project</td>
<td>40</td>
<td>YEAR</td>
<td>Core</td>
</tr>
</tbody>
</table>

**Learning, Teaching and Assessment**

**Academic Regulations Exemption:**

Section Q.6. - Continuation and Progression Arrangements. In order to progress to level 7, students must achieve a minimum of a lower second class classification on completion of level 6.

Section A.2.7. - Exemption to permit the use of 40 credit year-long modules at levels 4, 5, 6 and 7 and all modules to be delivered in a year-long structure

APPROVED by AFRSC (4/6/2015)

Reference Points:
The following PSRB and QAA subject benchmarks have been consulted in the development of learning outcomes of this course, thereby ensuring that the academic requirements of the appropriate PSRBs (Institution of Engineering and Technology (IET)) are addressed:

- Engineering Council UK-SPEC 2015
- Framework for Higher Education Qualifications (FHEQ) - descriptors for a qualification at Honours (H) level and at Masters (M) level:

The School of Engineering and the Built Environment publication "Equality and Diversity in the Curriculum" has been used to inform the design of the teaching and learning materials and the assessment regime.

Learning Outcomes:

CertHE Course Learning Outcome 1 (CHECLO1)
Demonstrate knowledge of the underlying concepts and principles associated with your area(s) of study, and an ability to evaluate and interpret these within the context of that area of study

CertHE Course Learning Outcome 2 (CHECLO2)
Demonstrate an ability to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgements in accordance with basic theories and concepts of your subject(s) of study.

CertHE Course Learning Outcome 3 (CHECLO3)
Evaluate the appropriateness of different approaches to solving problems related to your area(s) of study and/or work

CertHE Course Learning Outcome 4 (CHECLO4)
Communicate the results of your study/work accurately and reliably, and with structured and coherent arguments

CertHE Course Learning Outcome 5 (CHECLO5)
Demonstrate the qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility

DipHE Course Learning Outcome 1 (DHECLO1)
Demonstrate knowledge and critical understanding of the well-established principles of your area(s) of study, and of the way in which those principles have developed with an understanding of the limits of your knowledge, and how this influences analyses and interpretations based on that knowledge.

DipHE Course Learning Outcome 2 (DHECLO2)
Demonstrate the ability to apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context

DipHE Course Learning Outcome 3 (DHECLO3)
Demonstrate knowledge of the main methods of enquiry in the subject(s) relevant to the named award, and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study
DipHE Course Learning Outcome 4 (DHECLO4)

Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis

DipHE Course Learning Outcome 5 (DHECLO5)

Effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively

DipHE Course Learning Outcome 6 (DHECLO6)

Demonstrate the qualities and transferable skills necessary for employment, requiring the exercise of personal responsibility and decision-making and undertake further training, developing existing skills and acquire new competences that will enable them to assume significant responsibility within organisations

Honours Degree Course Learning Outcome 1 (DEGCLO1)

Design and demonstrate creativity in the design and synthesis of electronic and telecommunications products, systems, and processes and apply an innovative approach to their physical realisation

Honours Degree Course Learning Outcome 2 (DEGCLO2)

Effectively research unfamiliar subject areas in electronics, telecommunications and cognate disciplines, and thereby propose and evaluate a broad range of solutions to engineering problems

Honours Degree Course Learning Outcome 3 (DEGCLO3)

Select and apply appropriate mathematical methods to solve problems in the analysis and synthesis of electronic and telecommunications engineering systems

Honours Degree Course Learning Outcome 5 (DEGCLO5)

Select and apply appropriate software packages for design, analysis, and synthesis applications and critically evaluate the results

Honours Degree Course Learning Outcome 6 (DEGCLO6)

Relate theory and practice, thereby facilitating the efficient realisation of viable electronic and telecommunication engineering products and systems

Overview of Assessment:
<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Course Learning Outcomes</th>
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<td>CHECLO1, CHECLO2, CHECLO3, CHECLO5</td>
</tr>
<tr>
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<td>Engineering Science</td>
<td>CHECLO1, CHECLO2, CHECLO6</td>
</tr>
<tr>
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<td>Mechanical Engineering Principles</td>
<td>CHECLO1, CHECLO4, CHECLO5</td>
</tr>
<tr>
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<td>CHECLO2, CHECLO3, CHECLO4</td>
</tr>
<tr>
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<td>Applied Engineering</td>
<td>CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5</td>
</tr>
<tr>
<td>5MA013</td>
<td>Thermodynamics and Fluids</td>
<td>DHECLO1, DHECLO2, DHECLO4</td>
</tr>
<tr>
<td>5MA016</td>
<td>Industrial Placement</td>
<td>DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6</td>
</tr>
<tr>
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<td>Signal Processing I</td>
<td>DHECLO1, DHECLO3, DHECLO5, DHECLO6</td>
</tr>
<tr>
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<td>Embedded Systems Design</td>
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<tr>
<td>6MA011</td>
<td>ESEE: Economic, Social, Ethical and Environmental</td>
<td>DEGCLO1, DEGCLO6, ORDCLO1, ORDCLO6</td>
</tr>
<tr>
<td>6MA017</td>
<td>Individual Research Project</td>
<td>DEGCLO2, ORDCLO2</td>
</tr>
<tr>
<td>6MA021</td>
<td>Signal Processing II</td>
<td>DEGCLO3, DEGCLO5, ORDCLO3, ORDCLO5</td>
</tr>
<tr>
<td>6MA025</td>
<td>Mechatronic System Design</td>
<td>DEGCLO1, DEGCLO6, ORDCLO1, ORDCLO6</td>
</tr>
<tr>
<td>6MA026</td>
<td>Control Engineering I</td>
<td>DEGCLO2, DEGCLO3, DEGCLO5, ORDCLO2, ORDCLO3, ORDCLO5</td>
</tr>
</tbody>
</table>

Teaching, Learning and Assessment:

The following learning activities support the achievement of the course learning outcomes:

1. Reading – core and supplementary texts, journals and electronic sources
2. Group activities aimed at developing team-working skills in a multi-disciplinary environment
3. Preparing written presentations; both analytically and textually based
4. Oral presentations; both group and individual
5. Lectures and laboratory sessions
6. Group and individual tutorials
7. Engaging in informed discussion with fellow students and academic staff in tutorials and seminars
8. Information retrieval from articles, journals and books for assessments
9. Problem-based learning techniques, e.g. design projects, case studies
10. Providing solutions to meet real world problems/requirements
11. Solving closed and open ended problems
12. Using computer software and hardware to model and simulate products and engineering systems
13. Engaging in informed discussion with fellow students and academic staff in tutorials
14. Student led presentations
15. Researching articles, journals and books for assessments
16. Applying systematic methods to develop (novel) solutions
17. Coursework reports (technical and discursive)
18. Preparing for unseen examinations
19. Writing Project dissertation
20. Critical examination of data
21. Working within accepted guidelines
22. Simulation and problem solving exercises.

Learning and Teaching Methods:
This data indicates the proportion of time in each year of study that students can expect to engage in the following activities (expressed as a percentage for each level).

<table>
<thead>
<tr>
<th>Level</th>
<th>Teaching</th>
<th>Independent</th>
<th>Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>26</td>
<td>74</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
<td>76</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>24</td>
<td>76</td>
<td>0</td>
</tr>
</tbody>
</table>

Assessment Methods:

This data indicates the proportion of summative assessment in each year of study that will derive from the following: (expressed as a percentage for each level).

<table>
<thead>
<tr>
<th>Level</th>
<th>Written Exams</th>
<th>Practical Exams</th>
<th>Coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>42</td>
<td>0</td>
<td>58</td>
</tr>
<tr>
<td>5</td>
<td>38</td>
<td>0</td>
<td>62</td>
</tr>
<tr>
<td>6</td>
<td>32</td>
<td>0</td>
<td>68</td>
</tr>
</tbody>
</table>

Student Support:

Enhanced learning support is provided in the following areas:

1. Support for mathematics and analytic-based modules via the Mathletics software package
2. Face-to-face tutorial sessions in mathematics
3. Report writing and oral/presentation communications skills
4. Learning centre – literature searches and information searches
5. Practical/lab/experimental activities and reporting
6. Research for project work (major individual, group at M-level, plus group assignments at L5/6)
7. Promotion of independent learning during tutorials, face-to-face sessions.

University provided support:

As well as providing general counselling support the University Counselling Service provides short courses on topics such as "Self Confidence", "Stress Management and Relaxation" and "Life Skills". They also provide study skills and academic support, providing short courses such as provide help in areas such as "Writing and Assignment Skills", "Exam Techniques", "Enhancing Professional Skills", "Personal Development Planning" and "Making Choices for the Future."

In addition to the subject knowledge that you will gain from studying on your course, there are opportunities available to develop a range of skills that will help with your academic work; such academic skills include giving presentations, group work, academic writing, referencing and time management (specific help for maths is also available).

The Learning and Skills Team in Learning and Information Services (LIS) offer year-round academic skills support and guidance to all students. Students who are new to academic study and unsure of how to get started, or any student who wants to improve on their academic performance can attend drop-in sessions and workshops, or obtain advice via email or Skype. More details about how the Learning and Skills Team can help you are available at; [http://www.wlv.ac.ukskills](http://www.wlv.ac.ukskills)
Employability in the Curriculum:

The Mechatronics subject area provides career opportunities in a broad spectrum of industrial activities, as well as offering a gateway to all levels in the education sector. Mechatronics graduates have followed career paths as diverse as research and development within aerospace companies through to secondary school teaching.

In the contemporary industrial environment, the approach to problem solving, design, and research and development activities is to form multidisciplinary teams, thereby ensuring that all avenues are explored and evaluated. The Mechatronics engineer is well placed in this structure, since the ethos of the subject is broad based.

The course enables graduates to attain management positions, with significant levels of responsibility within a relatively short time.

Graduates may also study for a taught postgraduate degree, MSc, or a research degree, MPhil/PhD, within the Department.

The transferable skills gained during the course, including: project management, group working, and analytical thinking, also enable a graduate to pursue careers in non-technical fields such as: law, accountancy, authoring, and computing.