

## Nottingham Trent University Course Specification

### Basic Course Information

1.	Awarding Institution:	Nottingham Trent University
2.	School/Campus:	School of Science and Technology
3.	Final Award, Course Title and Modes of Study:	BEng (Hons) Sport Engineering
4.	Normal Duration:	3 Years FT, 4 Years SW
5.	UCAS Code:	C650/C651

### 6. Overview and general educational aims of the course

BEng (Hons) Sport Engineering is designed to provide you with a multidisciplinary approach to Sport Engineering built upon a strong foundation in aspects of mathematics, engineering science, skills in electronic and mechanical engineering, and sport and exercise science. You will study sport engineering in practical, theoretical and industrial contexts and utilise these when considering engineering solutions for improving human performance and success in sport. There is an emphasis on developing knowledge and understanding such that you acquire the skills, qualities and attributes expected by employers or for postgraduate studies and research.

Sport engineers use their knowledge of science and mathematics to help solve problems associated with sport, health and exercise, such that they enable humans to maximise their adaptations to training, maximise their performance, or overcome the limitations of the human body, such that engineering in sport equipment and technology helps them to gain an advantage otherwise not possible. Sport engineers achieve these aims by developing new or better materials, processes, equipment and devices that help to optimise human function and reduce the risk of injury. The areas of specialisation for sport engineers include those directed at optimising the function of equipment used in sport and exercise, or optimising how the human functions and adapts to sport and exercise.

Sport engineers are involved in the development of products which may come from the following general areas:

- Surfaces designed to maximise human function and avoid injury;
- Garments such as clothing which may look to optimise recovery from exercise or improve the way an athlete performs during exercise by enabling better cooling, improved movement technique, or less drag;
- Footwear designed to reduce the risk of injury and enhance the movements of the performer to move faster, jump higher and turn more precisely;
- Personal Protective Equipment designed to protect the athlete from forces associated with collisions in contact sports or to protect from impacts associated with projectiles;
- Machines such as bikes and gym equipment to promote performance or improved training response;
- Electronic Technologies such as wireless technologies and apps designed to quantify exercise load and effectiveness;
- Balls/projectiles, rackets, bats and clubs and other equipment used in sport and often constrained by the laws of the sport.

Sport engineering is a very diverse field which is also rapidly developing. It is important that your course is both current and relevant to your future career. Your course will work closely with industrial partners and use industry-led projects to ensure that at the end of your studies you are as well prepared as possible for a career in this exciting and rewarding field. You should be prepared for module content

which must be flexible to keep up with the rapid technological developments and regulatory changes that take place in sport. Such flexibility is paramount in ensuring you are entering the workplace with industry-relevant and industry-acquired skills.

This course will teach you the skills required to operate as an effective Sport Engineer and solve problems using the engineering design process. This process consists of the following eight steps:

1. Identify the need or problem
2. Research the problem
3. Develop possible solutions
4. Select the best possible solution
5. Construct a prototype
6. Test and evaluate
7. Communicate the solution
8. Redesign

This course is offered in full time mode (3 years) and sandwich mode (4 years). In the sandwich mode you will spend a period of one year, between the 2<sup>nd</sup> and 3<sup>rd</sup> years of academic study, in a placement in a Sport Engineering role.

A version of this course is also offered with an integrated foundation year – BEng (Hons) Sport Engineering (with foundation year). See course specification for the Foundation Year in Engineering and Mathematics.

## **7. Course outcomes**

Course outcomes describe what you should know and be able to do by the end of your course if you take advantage of the opportunities for learning that we provide.

### **Knowledge and understanding**

By the end of the course you should be able to:

1. Apply and integrate knowledge of scientific and mathematical principles to solve engineering problems, with consideration for limitations, risks, and new and existing technologies.
2. Evaluate scientific and mathematical literature to analyse and solve engineering problems.
3. Apply and integrate theory and knowledge of design processes and methodologies to develop rigorous and creative solutions that are fit for purpose.
4. Demonstrate understanding of engineering principles and techniques and their applications in Sport engineering.
5. Evaluate business, customer and user needs to establish solutions that are fit for purpose.
6. Integrate the commercial, economic and social context into the engineering process.
7. Apply professional and ethical conduct in engineering.

*These statements are aligned to the QAA subject benchmark statements for engineering (2015) and have been developed to fully meet the academic accreditation requirements of the Institute of Engineering and Technology for Incorporated Engineer registration and to partially meet the academic accreditation requirements of the Institute of Engineering and Technology for Chartered Engineer registration.*

### **Skills, qualities and attributes**

By the end of the course you should be able to:

8. Proficiently apply mathematical, statistical and computational methods, tools and notations in the analysis and evaluation of data.
9. Identify, classify and describe systems using analytical and modelling techniques.
10. Plan and manage the design process by defining problems, identifying industry relevant constraints and communicating ideas effectively.
11. Apply practical and laboratory skills using appropriate equipment and processes.
12. Work effectively as part of an engineering team.
13. Demonstrate the ability to evaluate risk throughout the engineering process.

*These statements are aligned to the QAA subject benchmark statements for engineering (2015) and have been developed to fully meet the academic accreditation requirements of the Institute of Engineering and Technology for Incorporated Engineer registration and to partially meet the academic accreditation requirements of the Institute of Engineering and Technology for Chartered Engineer registration.*

## **8. Teaching and learning methods**

In most modules you will focus on problem solving and project work either using real industrial case studies or by working with industry-led projects. Much of the time you will be working on real world problems and with students from other engineering disciplines. In addition you will have lectures supported by practical, laboratory classes and workshops. Much of the theory introduced in lectures is consolidated through laboratory and practical sessions and small group seminars. Course material is supported through e-resources. The University Virtual Learning Environment (NOW) is widely used to share laboratory data, present supplementary resources such as summary slides of lectures and links to online videos, resources such as articles and recent research papers and information about the organization of modules and the course.

Opportunities will exist for you to enhance your communication skills by writing reports in various formats and by giving oral presentations to your colleagues. Seminars and tutorials are used to offer a small group teaching environment, often led by students' needs, teaching through misconceptions and problem-based methods and reviewing, discussing and considering aspects of taught material associated with case studies, lectures, workshops or laboratory classes.

A strong foundation in materials, workshop and design skills is required to understand how a product should be made to ensure it meets the needs of the end-user or desired task, is appropriate for ongoing maintenance, and how its full life cycle is considered, such as suitable materials and methods for disposal.

Laboratory classes develop hands-on practical skills in the application of key principles, concepts and methods of Sport and General Engineering. These will involve you examining, developing and troubleshooting current Sport Engineering products. Laboratory sessions involve problem solving, data collection and observation. Further time is allocated to the analysis, interpretation and evaluation of the results both inside and outside these practical classes. In this way you will develop your skills to undertake self-directed study and to become an autonomous, independent learner. You will also be expected to carry out supplementary reading and research to consolidate taught material. All of these practices are combined in your final year where you will undertake an individual period of research which will be laboratory or industry based.

During the course of your studies, you will assemble a Professional Portfolio, which you can use to reflect on the skills and attributes which you acquire. This Portfolio will

prove useful when completing your CV, and when applying for jobs at the end of the course.

## **9. Assessment methods**

The course uses a variety of assessment methods to enable you to demonstrate achievement of the learning outcomes. Subject knowledge and understanding are mainly tested through tests and examinations, preparation of case studies, write-ups of laboratory practical work, technical reports and oral presentations.

Laboratory investigations are used to assess a range of intellectual and practical skills. Your ability to test hypotheses, observe, collate, present, interpret and evaluate findings of investigations is assessed through the preparation of laboratory reports.

Your communication skills, in written and oral formats are assessed at numerous points throughout the course. Case study reports, laboratory reports, technical reports and examinations provide you with opportunities to demonstrate your writing skills. Oral presentations and verbal defences offer ways for you to demonstrate your verbal communication skills.

You will receive written feedback on all your assessed work to help you to develop as a learner and to ensure you achieve both your personal goals and the standards expected by industry.

## **10. Course structure and curriculum**

The BEng (Hons) Sport Engineering degree is a 3-year full time or 4 year sandwich course. The academic year comprises 30 weeks divided into 3 terms. Teaching and learning take place for 26 weeks with the final 4 weeks of each year being set aside for examinations. In the first year (level 4) you will study five modules which are a mix of engineering and sport engineering modules. In the second year (level 5) you study six modules. In your third year (level 6) you will work on an individual project. In addition you will study one engineering module, one sport engineering module and two optional specialised modules relevant to sport engineering.

If you are on the sandwich course you will spend a year on placement between levels 5 and 6. Preparation for placement applications begins early in year 2. Members of the Employability Team work individually with you to develop your CV and to complete application forms and letters etc. The Employability Team also provide placement presentations, group workshops, webinars and resources to support you in your search for a placement.

While you are on placement you will be allocated a visiting tutor from the Engineering academic staff. Your tutor will contact you each term and, if you are in the UK, will visit you at your workplace at least once during your placement. If you are overseas your tutor will contact you via video-conferencing. Towards the end of your placement year you will be invited to a call-back event to reintroduce you to NTU, the campus and your course, and provide an opportunity for you to discuss ideas regarding your individual project.

The BEng (Hons) Sport Engineering degree is modular and addresses key aspects of sport engineering with particular relevance to the sport engineering industry. The modules selected on the degree are designed to meet the course learning outcomes.

The course structure is shown below:

Modules are 20 credit points unless otherwise stated.

#### Level 4.

Engineering Science Fundamentals  
Engineering Mathematics and Technical Computing  
Innovation and Engineering Solutions (40 credit points)  
Principles of Electronics and Electronic Systems  
Anatomy, Physiology and Biomechanics

#### Level 5.

Digital Systems and Computer Engineering  
Engineering Modelling and Simulation Techniques  
Industrial Design and Product Case Studies  
Integrated Group Design Projects  
Sport Technology  
Experimental Biomechanics and Physiology

#### Level 6

Performance Engineering  
Individual Engineering Project (40 credit points)  
Experimental Methods in Human Performance

Level 6 options – choose 2 from:

Wireless and RF Communications  
Sensors and Embedded Electronics  
Human Factors Engineering  
Sustainable Design and Product Death  
Mechanical Engineering in Sport

A BEng Honours degree is awarded to students who successfully complete 360 credit points; 120 credit points at each of levels 4-6. A BSc Ordinary Degree is awarded to a student who successfully completes 300 credit points at levels 4-6. A Diploma of Higher Education is awarded to a student who successfully completes 240 credit points; a Certificate of Higher Education is awarded to students who successfully complete 120 credit points.

### **11. Admission to the course**

#### **Entry requirements.**

For current information regarding all entry requirements for this course, please see the 'Applying' tab on the NTU course information web page.

The full UCAS entry profile for this course can be found at:  
<http://www.ucas.com/>

### **12. Support for learning**

We will work with you to ensure that you settle into your new academic environment and that your studies go well.

All students at Nottingham Trent University have full access to Student Support Services. In addition, School-based support networks are in place to offer you support, guidance and advice on academic and personal issues. Within the course, students experience the full support of their Course Leader, Module Leaders, and Tutors, who take responsibility for student support and guidance. The Module Leader will offer guidance and support to students taking each specific module.

Academic staff can be contacted by e-mail, telephone, letter, or in person.

As a new student you will experience a minimum of a 3 day induction period at the commencement of your first academic year. Induction will inform you about:

- Student Support Services at University, School and Course level;
- University policies and procedures on academic systems;
- Personal development planning;
- Timetable issues, room allocations and location;
- University, School and Course Handbooks;
- Enrolment procedures;
- Computing, IT and Library services;
- Careers advice and the Employability Team;
- Health and Safety procedures.

During your induction you will be assigned a Course Tutor and informed about the best way to get in touch with your Course Leader and Module tutors. There will be a minimum of twelve course tutorial meetings at level 4 and a minimum of five at levels 5 and 6. Course tutorials help you to reflect on your approach to study and make connections between modules, integrating material from across the curriculum and encouraging you to achieve your potential. You also have an opportunity to discuss and deal with any personal or course-related issues that may be affecting your studies and get advice on the support the university can offer. Course tutorials, particularly at levels 4 and 5, are used to manage the projects you are working on, and to support you in developing your Professional Portfolio. Specific advice and guidance on option choices is given at level 6 to assist you in choosing options that best fit your interests, skills and aspirations.

Student Mentors are also available to provide you with learning support. Student Mentors are typically students at Level 5 and above of their course, who provide some form of mathematics, academic writing or module-specific support. Such support is usually available on a 'help desk' basis.

The University provides a wide range of student services, where you can get support and advice on issues such as finance, dyslexia and disability, and personal problems.

[http://www.ntu.ac.uk/student\\_services/index.html](http://www.ntu.ac.uk/student_services/index.html)

For accommodation matters, University Accommodation Officers will provide you with information, guidance and continuing support, for example hall of residence, private rented accommodation, and the Landlord Approval Scheme. The Accommodation Services can be accessed through [www.ntu.ac.uk](http://www.ntu.ac.uk).

### **13. Graduate destinations/employability**

There is a wide range of career opportunities for Sport Engineers. As a BEng (Hons) graduate typical roles would be: Product Engineer; Product Developer; Product Manager; Engineering Project Manager; Product Designer; Materials Scientist; Manufacturing Engineer; Production Engineer; Commercial Manager; Sports Science; Bio-Mechanical Engineer; Production Quality and/or Assurance Manager; Research and Development Engineer.

Employment opportunities include a wide variety of sports manufacturers, National Governing Bodies, materials companies and general engineering companies.

Your course will also prepare you well for postgraduate study.

This course design, its learning outcomes, themes and content have been developed based on industry guidelines, through discussions with sector employers. Sport engineering employers and stakeholders identified a number of important considerations for the training of highly qualified and industry relevant sport engineering graduates:

- Consideration should be given to the provision of accreditation and relevance of placements and assessment against vocational standards or qualifications.
- Formal accreditation and industry relevant vocational qualifications and experiences should be incorporated.
- Project and placement opportunities should prepare students for time and business constraints and ensure the student is able to develop a product suitable for market from conception to manufacture.
- Students should have an appreciation of and be comfortable in using different and appropriate working and communication styles relevant to Sport Engineering companies, and be able to interact effectively both independently and in a team to maximise the value of their input to employers.
- Industry relies heavily on research, and academic knowledge should be developed to support this. A strong understanding of a wide range of engineering principles is considered critical, including mathematics for engineering and statistical analysis.
- It was considered critical for all graduates to study the sport product cycle, from research and development, to elite sports use, and eventually through to mass market retail and commercialisation.

The course structure includes modules and opportunities in its design to encompass all of these stakeholder requirements.

#### **14. Course standards and quality**

The Course Committee, with staff, industry and student representatives, operates to discuss matters arising on the course, review module feedback and consider the Course Standards and Quality report and external examiners' comments. Overarching responsibility for quality control lies with the School Academic Standards and Quality Committee whose remit is to provide guidance and support to academic courses.

External Examiners offer further quality control through monitoring academic standards, moderation of assessment tasks and processes. An annual Sport Engineering Employers Forum ensures that our provision is relevant to industry requirements.

#### **15. Assessment regulations**

This course is subject to the University's Common Assessment Regulations (located in Section 16 of the Quality Handbook). Any course specific assessment features are described below:

Your final degree classification is based on 20% of your Level 5 average and 80% of your Level 6 average.

#### **16. Additional Information**

Collaborative partner(s):

Course referenced to Quality Assurance Agency for Higher Education (QAA) Engineering, 2015

Benchmark Statements:

Course recognised by:

Date this course specification approved: February 2020

Any additional information: