

Programme Specification

MSc Transportation Planning and Engineering 2019/20

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Mode of study	Full time / Part time
Duration	1 year full time / 2 years part time
Accreditation details	Institution of Civil Engineers, Institution of Structural Engineers, Chartered Institution of Highways and Transportation (including Transport Planning Professional), Institute of Highway Engineers, Chartered Institute of Logistics and Transport
Final award	Master of Science
Name of award	Transportation Planning and Engineering / Infrastructure Transportation Planning and Engineering / Behaviour Transportation Planning and Engineering / Operations
Interim Exit awards	Postgraduate Certificate Postgraduate Diploma
FHEQ level of final award	7
UCAS code	N/A
QAA Subject Benchmark or other external reference	Engineering 2010, Engineering Council UK-SPEC, Joint Board of Moderators
Programme Coordinator	Dr Simon Blainey
Date specification was written	31 st March 2013
Date programme was validated	March 2019
Date specification last updated	February 2019

Programme Overview

As a student on the programme, you will gain a sound knowledge of the theory and concepts involved in transportation planning and engineering. You will benefit from the expertise available within our Transportation Research Group, as well as from transport professionals from external organisations who contribute to the programme.

Learning and teaching

Acquisition of core knowledge and understanding is through lectures, seminars, tutorials, field and laboratory classes, workshops, and independent study and research. You are encouraged from an early stage to supplement and consolidate your understanding and knowledge by independent study.

Assessment

This is through a mix of coursework, examination and dissertation. Most modules involve individual or group-based coursework to help students to become practised in the application of the theories introduced in lectures. Much of this coursework uses 'real' situations and case studies that draw together different elements of the programme. Computer modelling applications can include:

- SPSS for statistical modelling
- 'microscopic' traffic models, such as VISSIM and AIMSUN
- LINSIG for network modelling
- ARCADY for junction design
- ArcGIS for spatial modelling and mapping

As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration; however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's programme validation process which is described in the University's quality handbook.

Educational Aims of the Programme

The aims of the programme are:

1. For you to gain a sound knowledge and understanding of the key issues and processes in transportation planning and engineering.
2. To provide relevant education and training whether you are from a developed or less developed country.
3. To provide you with a range of specialist modules integrated within the structured learning environment, reflecting the internationally-renowned research expertise within the Faculty, in order to broaden and deepen your educational experience.
4. To develop your skills in critical appraisal and analysis of transport options and systems, in independent research and in oral and written communications.
5. To train you to enable you to become a professional transportation planner/engineer who meets the requirements of the Engineering Council (i.e. UK-SPEC), and to have a broad range of knowledge and skills (including IT and communications) capable of meeting the present and future demands of industry and commerce.
6. To provide relevant in-career postgraduate training for professionals working in transportation planning and engineering
7. To provide you with a supportive and intellectually stimulating environment that encourages an attitude of independent learning and enquiry, and fosters an ethos of lifetime learning and professional development.
8. To offer you individual and group projects and assignments which are supported by the research activities within the Faculty and stimulate the individual innovation, self-assessment and teamwork skills required in engineering.

Programme Learning Outcomes

The programme provides opportunities for you to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have been developed with reference to the Accrediting Institution guidelines and the UK-SPEC Degree Output Standards General and Specific Learning Outcomes.

Knowledge and Understanding

Having successfully completed this programme you will be able to demonstrate knowledge and understanding of:

- A1. The relevant scientific principles relating to transport planning and engineering.
(contributes to meeting AHEP LOs SM1, SM3)
- A2. Transport Governance, issues relevant to transport policy formulation, transportation planning methods, modelling techniques and practical applications
(contributes to meeting AHEP LOs SM5, SM6, EA2)
- A3. Transportation Engineering analysis and design, including traffic flow theory, analytical methods, transport infrastructure design and modelling.
(contributes to meeting AHEP LOs SM1, SM2, EA2)
- A4. Transport management applications in urban and inter-urban environments, including with use of Intelligent Transport Systems.
(contributes to meeting AHEP LOs SM1, SM3, SM4, EA5, EL3, EL7)
- A5. Multi-modal passenger and freight transport systems, including their characteristics, applications and evaluation.
(contributes to meeting AHEP LOs SM3, SM6)

- A6. Environmental issues and impacts of transport, including local and global emissions, energy consumption, noise, environmental impact assessment and environmental protection (contributes to meeting AHEP LOs SM3, SM6, D2, EL4)
- A7. Transport Economics, from both theoretical and practical perspectives (contributes to meeting AHEP LOs SM2, SM5, EL7)
- A8. Highway Engineering, including materials, structural design, maintenance and rehabilitation (contributes to meeting AHEP LOs SM1)
- A9. Current problems and new insights in transport planning and engineering. (contributes to meeting AHEP LOs SM4, SM6, EA5, P9)
- A10. Transport data analysis methods and techniques, including statistical processes (contributes to meeting AHEP LOs SM2, SM5)
- A11. Design processes and methodologies and their application to address transport-related problems and challenges. (contributes to meeting AHEP LOs D5, D7)
- A12. The Transportation research process, through the completion of an individual project
- A13. Information and communication technology relevant to the practice of Transportation Planning and Engineering (contributes to meeting AHEP LOs SM3)
- A14. Health and safety issues, risk assessment and regulatory frameworks. (contributes to meeting AHEP LOs D2, EL5, EL6, P5, P6)
- A15. The need for a high level of professional and ethical conduct in the transport industry, and the social and professional responsibilities of transport planners and engineers (contributes to meeting AHEP LOs EL1)
- A16. The commercial and social context within which transport systems operate. (contributes to meeting AHEP LOs SM6, D1, D2, EL2, EL7, P1)

Teaching and Learning Methods

Acquisition of core knowledge and understanding is through lectures, seminars, tutorials, field and laboratory classes, workshops, and independent study and research. You are encouraged from an early stage to supplement and consolidate your understanding and knowledge by independent study.

Assessment Methods

Testing of the knowledge base is through a combination of unseen written examinations and assessed coursework in the form of problem solving exercises, laboratory reports, design exercises, essays and individual and group projects.

Subject Specific Intellectual and Research Skills

Having successfully completed this programme you will be able to:

- B1. Plan, conduct and report on an individual research programme. (contributes to meeting AHEP LOs D5)
- B2. Analyse and produce transport plans, consistent with policy statements
- B3. Analyse and solve engineering problems, using appropriate mathematical methods as necessary. (contributes to meeting AHEP LOs EA3, EA6, D4, P2)
- B4. Be creative in the solution of problems and in design development. (contributes to meeting AHEP LOs SM1, D4)
- B5. Design engineering elements and systems to meet a need, evaluate critically and make improvements. (contributes to meeting AHEP LOs EA1, EA4, D3, D4, D8)
- B6. Integrate and evaluate knowledge, understanding, information and data from a variety of sources and disciplines. (contributes to meeting AHEP LOs EA4)
- B7. Identify and implement statistical techniques for analysing transport data, appropriate for the analysis requirements. (contributes to meeting AHEP LOs EA3, EA6)
- B8. Assess the limitations of a range of analysis tools and methods when applied in a transport context. (contributes to meeting AHEP LOs P2, P8, P9)

- B9. Take a holistic approach to solving problems and designing systems, applying professional judgement to balance risks, cost, benefits, safety, reliability, aesthetics and environmental impact.
(contributes to meeting AHEP LOs D2, D4, P5, P7, P10)
- B10. Assess the sustainability of transport planning and engineering schemes.
(contributes to meeting AHEP LOs EL4)

Teaching and Learning Methods

- Intellectual skills are developed through the teaching and learning activities.
- Analysis and problem solving skills are further developed through regular problem sheets issued by module lecturers and through small group teaching.
- Experimental, research and design skills are further developed through coursework exercises, laboratory, and design and research projects.
- Individual feedback is provided on all work submitted.

Assessment Methods

- Analysis and problem solving skills are assessed through unseen written examinations and problem based exercises.
- Experimental, research and design skills are assessed through laboratory reports, coursework exercises, project reports and oral presentations.

Transferable and Generic Skills

Having successfully completed this programme you will be able to:

- C1. Communicate effectively – in writing, verbally and through drawings
(contributes to meeting AHEP LOs D6)
- C2. Apply mathematical skills – algebra, geometry, modelling and analysis.
(contributes to meeting AHEP LOs P3, G1)
- C3. Learn independently in familiar and unfamiliar situations with open-mindedness and in a spirit of critical enquiry.
- C4. Work constructively as a member of a team.
(contributes to meeting AHEP LOs P11, G1, G4)
- C5. Manage time and resources.
- C6. Use Information and Communications Technology in a transport context.
(contributes to meeting AHEP LOs G1)
- C7. Use the library, internet and other sources effectively.
(contributes to meeting AHEP LOs P4)
- C8. Manage tasks and solve problems, transfer techniques and solutions from one area to another, apply critical analysis and judgement.
(contributes to meeting AHEP LOs D4, D7)
- C9. Plan self-learning and improve performance, as the foundation for lifelong learning and CPD.
(contributes to meeting AHEP LOs G2)
- C10. Plan and carry out a personal programme of work, adjusting this where appropriate to reflect changing circumstances.
(contributes to meeting AHEP LOs G3)
- C11. Exercise initiative and personal responsibility.
(contributes to meeting AHEP LOs G4)

Teaching and Learning Methods

The development of transferable skills is embedded in all modules of the programme. Typically, this takes the form of project based work and problem based learning.

Assessment Methods

Skills are formatively assessed through written reports and oral presentations, practical and laboratory reports. Summative assessment is through unseen examinations, extended essays and completion of a research project, including an interim progress report.

Subject Specific Practical Skills

Having successfully completed this programme you will be able to:

- D1. Present and argue a case for or against a transport scheme
(contributes to meeting AHEP LOs D1)
- D2. Analyse experimental results and assess their validity.
- D3. Prepare technical drawings and reports
(contributes to meeting AHEP LOs D6)
- D4. Give technical presentations using a variety of media.
(contributes to meeting AHEP LOs D6)
- D5. Use computer packages to design and evaluate different aspects and features of transport systems.
(contributes to meeting AHEP LOs P2)
- D6. Make effective use of scientific literature from various sources.

Teaching and Learning Methods

Practical skills are developed in experimental laboratories, computer laboratories, design exercises and research based investigations.

Assessment Methods

Practical skills are assessed through laboratory experiment reports, coursework exercises, project reports and presentations.

Programme outcomes for different exit points

Level 7 (MSc)	Much of the study undertaken at Masters level reflects research at the forefront of Transportation Planning and Engineering, and you will have contributed to research of this kind. You will have shown originality in the application of knowledge, and you will understand how the boundaries of knowledge are advanced through research. You will be able to deal with complex issues both systematically and creatively, and show originality in tackling and solving problems individually and as part of a team. You will have the qualities needed for employment in circumstances requiring sound judgement, personal responsibility and initiative, in complex and unpredictable professional environments.
PGDip	You will have attained knowledge of research being undertaken by academic staff at the forefront of Transportation Planning and Engineering. You will have shown that you are capable of applying knowledge to solve problems, and you will understand how the boundaries of knowledge are advanced through research. You will be able to deal with complex issues both systematically and creatively, and be able to contribute to solving problems individually and as part of a team. You will have the qualities needed for employment in circumstances requiring sound judgement and personal responsibility under the guidance of others, in complex and unpredictable professional environments
PGCert	You will have been exposed to research being undertaken by academic staff at the forefront of Transportation Planning and Engineering. You will have gained experience in applying knowledge to solve problems, and you will understand how the boundaries of knowledge are advanced through research. You will be able to deal with complex issues by following existing procedures, and will be able to contribute to solving problems individually and as part of a team. You will have some of the qualities needed for employment in circumstances requiring sound judgement and personal responsibility under the guidance of others, in complex and unpredictable professional environments.

Programme Structure

The University uses the European Credit Transfer Scheme (ECTS) to indicate the approximate amount of time a typical student can expect to spend in order to complete successfully a given module or programme, where 1 ECTS indicates around 20 nominal hours of study. Previously, Credit Accumulation and Transfer Scheme (CATS) points were used for this purpose where 1 CATS

credit was 10 nominal hours of study. The University credit accumulation and transfer scheme is detailed at <http://www.calendar.soton.ac.uk/sectionIV/cats.html>.

The teaching is structured on a semester pattern. You study modules comprising 90 ECTS (180 CATS). The course is available either full-time or part-time. The full-time programme is completed over three semesters within one calendar year. The part-time programme is normally completed over six Semesters within two calendar years, although it can be taken over up to 4 years, by agreement.

In addition to the final award, there are the following exit points:

- Postgraduate Certificate of Higher education, following successful completion of 30 ECTS (60 CATS).
- Postgraduate Diploma of Higher education, following successful completion of 60 ECTS (120 CATS).

All students on the MSc programme are registered on themes, which are associated with award titles as shown in the table below. Part-time students may change theme at the end of their first year, as all option modules are taught on the second year of the part-time course.

MSc Theme	Award Title
Transport Infrastructure	Transportation Planning and Engineering / Infrastructure
Travel Behaviour	Transportation Planning and Engineering / Behaviour
Transport Operations	Transportation Planning and Engineering / Operations

Progression through the programme and classification of degrees are regulated by the standard university progression and classification rules which may be found in section IV of the University Calendar (<http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>) and in particular at <http://www.calendar.soton.ac.uk/sectionIV/credit-bearing-progs.html> and <http://www.calendar.soton.ac.uk/sectionIV/progression-regs-standalonemasters.html>

The Programme Structure is outlined in Appendix 1.

Typical course content

The full MSc programme consists of 11 taught modules and one individual project. Five of the taught modules are compulsory and six optional, with the individual project being core. Three option modules are required to be selected (in addition to the Core and Compulsory Modules).

The programme follows university guidelines for inclusivity and flexibility and provides an array of teaching and learning approaches that will enable any student who meets the entry requirements to access the curriculum and demonstrate achievement of all the intended learning outcomes.

Additional costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. Costs that students registered for this programme typically also have to pay for are included in Appendix 2.

Progression Requirements

The programme follows the University's regulations for [*Progression, Determination and Classification of Results: Postgraduate Master's Programmes*](#) as set out in the University Calendar <https://www.southampton.ac.uk/calendar/sectioniv/index.page>
Faculty specific regulations for Standalone Masters can be found here: <https://www.southampton.ac.uk/calendar/sectionvi/feps.page>

Intermediate exit points (where available)

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS credits	Minimum ECTS Credits required at level of award

Postgraduate Diploma	60	45
Postgraduate Certificate	30	20

Special Features of the programme

The MSc course in Transportation Planning and Engineering is characterized by high industry involvement in the planning and execution of dissertation projects, significant use of visiting lecturers and field studies. The module CENV6001 Transport Planning: Practice includes a mock public inquiry chaired by an industry expert where the students engage in debate of a realistic transport development.

The course includes a two day residential field trip, comprising museum visits, site visits, and a group challenge. Some modules include additional shorter field trips to transport-related locations in the Southampton area.

Programme details

The programme follows university guidelines for inclusivity and flexibility and provides an array of teaching and learning approaches that will enable any student who meets the entry requirements to access the curriculum and demonstrate achievement of all the intended learning outcomes.

Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- Library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources. There is a wide range of online training and workshops available to support writing, study skills, IT and maths. The Academic skills hub holds several workshops every week day to support students.
- High speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations. Students can also access SVE (Southampton Virtual Environment), a virtual Windows University of Southampton desktop that can be accessed from personal devices such as PCs, Macs, tablets and smartphones from any location.
- Computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources).
- Standard ICT tools such as Email, secure filestore and calendars.
- Access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- Central IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.
- Enabling Services offering assessment and support (including specialist IT support) facilities if you have a disability, dyslexia, mental health issue or specific learning difficulties.
- The Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards.
- Career and Employability services, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV.
- A range of personal support services: mentoring, counselling, residence support service, chaplaincy, health service.
- A Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides

- An academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- Opportunities for extracurricular activities and volunteering.
- An Advice Centre offering free and confidential advice including support if you need to make an academic appeal.
- Support for student peer-to-peer groups, such as Nightline.

In the School of Engineering and your Discipline you will be able to access:

- Student handbook for Civil Engineering students.
- Introductory sessions for all years of the programme.
- Library information retrieval seminar.
- Workshop training.
- Engineering Development and Manufacturing Centre (EDMC) equipped with a range of workshop equipment, CAD/CAM.
- Engineering specific software.
- Personal academic tutors to assist you with personal problems and to advise on academic issues (contact maintained during periods of studying abroad). A Senior Tutor is also available should you need additional support.
- Access to academic staff through an open door policy as well as timetabled tutor meetings, appointment system and e-mail.
- Research seminars and invited lectures.
- School Student Office for the administration of your programme.

Methods for evaluating the quality of teaching and learning

You will have the opportunity to have your say on the quality of your programme in the following ways:

- Anonymous evaluation questionnaires for each module of the programme.
- Acting as or represented by Student Representatives on the staff-student liaison committee. You are also represented on the School Programmes Committee and Faculty Education Committee.
- Meetings, individually or as group, with programme external examiner.

It should be noted that meetings with personal academic tutor can also be used to comment on quality related issues.

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Evaluation for each module of the programme based on your feedback from evaluation questionnaires and carried out by lecturer(s) involved in the module and a colleague acting as advisor.
- A discipline specific Education Board which convenes several times a year to consider the quality of delivery of each module of your programme.
- Moderation of examination papers, coursework and projects, both internally and externally.
- Comments by external examiners, who produce an annual report.
- Annual examiners' meetings and Boards of Examiners.
- Annual programme and module reviews considering your feedback from all sources, feedback from Education Boards, external examiners and other bodies and student performance in assessment.
- Periodic meetings of the Civil Engineering Industrial Advisory Board.
- Response to results from the National Student Survey.
- Accreditation by professional institutions.
- Programme Revalidation by the University at least every 5 years.

Note that quality assurance of part of the programme taken abroad, where applicable, is subject to the quality procedures of the relevant institutions. These procedures are subject to periodic monitoring by members of staff of the Faculty of Engineering and Physical Sciences.

Career Opportunities

Graduates from the MSc Transportation Planning and Engineering gain employment with a wide range of employers in the transportation planning and engineering field in the UK and overseas,

including (amongst others) local authorities, regional and national government organisations, transport operators and both specialised and multi-disciplinary engineering consultants. A number of students also choose to continue their studies by undertaking postgraduate research.

External Examiners(s) for the programme

Name Professor Iain Docherty
Institution. University of Glasgow

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal tutor in the first instance.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook at <http://www.southampton.ac.uk/student-services/academic-life/faculty-handbooks.page> and http://www.southampton.ac.uk/engineering/postgraduate/taught_courses/engineering.page

Revision History

March 2013 (A Bloodworth/N B Hounsell)

September 2013 (A Bloodworth, for revised Calendar regulations and Semester split of some modules)

June 2014 (A Bloodworth, code revised for Faculty module, additional sections added, for programme validation)

February 2015 -CQA updated core/compulsory modules.

Update to Programme Overview (CMA changes) - September 2015

February 2016 - minor updates

October 2016 (S Blainey, for revisions to programme structure)

Updated to reflect 2018/19 version and removal of Admissions Criteria - CQA March 2018

Updated Faculty name to Faculty of Engineering and Physical Sciences July 2018

February 2019 (S Blainey - changes to learning outcomes and other minor updates as part of programme revalidation)

MSc Transportation Planning and Engineering FT, Transportation Planning and Engineering PT

Appendix 1

Programme Structure

The information within this Appendix is liable to change in minor ways from year to year. It is accurate at the time of writing.

The taught component of the MSc consists of five compulsory modules totalling 37.5 ECTS (75 CATS) together with two theme-specific compulsory modules and a choice of one from four options totalling 22.5 ECTS (45 CATS), giving a total of 60 ECTS (120 CATS) across two semesters.

The research component of the MSc consists of a Core module (FEEG 6012) of 30 ECTS (60 CATS) which is a research dissertation.

Optional modules are subject to change each academic year. Please note in some instances modules have limited spaces available.

Compulsory Modules (all themes):

Module Code	Module Name	Semester	Part time year	CATS Credit Points
CENV6169	Transport Planning: Policy and Governance	1	1	15
CENV6001	Transport Planning: Practice	2	1	15
CENV6016	Transport Economics	2	1	15
CENV6124	Transportation Data Analysis and Techniques	1 & 2	1	15
CENV6153	Transport Modelling	1	1	15
FEEG6012	MSc Research Project	Non standard	2	60

Transport Infrastructure theme:

Module Code	Module Name	Semester	Part time year	CATS Credit Points
	Compulsory modules:			
CENV6171	Highway and Traffic Engineering	1	2	15
CENV3065	Railway Engineering and Operations	2	2	15
	Option module - one of:			
CENV6112	Transport, Energy and the Environment	2	2	15
CENV6170	Logistics Systems Operations	1	2	15
CENV6168	Transport Management and Safety	2	2	15
FEEG3004	Human Factors in Engineering	1	2	15

Travel Behaviour theme:

Module Code	Module Name	Semester	Part time year	CATS Credit Points
	Compulsory modules:			
FEEG3004	Human Factors in Engineering	1	2	15
CENV6112	Transport, Energy and the Environment	2	2	15
	Option module - one of:			
CENV6171	Highway and Traffic Engineering	1	2	15

CENV6170	Logistics Systems Operations	1	2	15
CENV6168	Transport Management and Safety	2	2	15
CENV3065	Railway Engineering and Operations	2	2	15

Transport Operations theme:

Module Code	Module Name	Semester	Part time year	CATS Credit Points
Compulsory modules:				
CENV6170	Logistics Systems Operations	1	2	15
CENV6168	Transport Management and Safety	2	2	15
Option module - one of:				
CENV6171	Highway and Traffic Engineering	1	2	15
FEEG3004	Human Factors in Engineering	1	2	15
CENV6112	Transport, Energy and the Environment	2	2	15
CENV3065	Railway Engineering and Operations	2	2	15

Mapping: Learning Outcomes with their assessment

Knowledge and Understanding	Where Assessed (examples)	How Assessed (examples)
A1. The relevant scientific principles relating to transport planning and engineering.	All modules	As a requirement for successful assessment in all modules
A2. Transport Governance, issues relevant to transport policy formulation, transportation planning methods, modelling techniques and practical applications	CENV6169 CENV6001	Coursework and examination Public Inquiry.
A3. Transportation Engineering analysis and design, including traffic flow theory, analytical methods, transport infrastructure design and modelling.	CENV6171 CENV6153	Coursework (junction design, including ARCADY/LINSIG modelling) and examination Traffic simulation coursework
A4. Transport management applications in urban and inter-urban environments, including with use of Intelligent Transport Systems.	CENV6168	Coursework (ITS Feasibility study) and Examination
A5. Multi-modal passenger and freight transport systems, including their characteristics, applications and evaluation.	CENV6001 CENV6170	Examination Related coursework (3 assessments)
A6. Environmental issues and impacts of transport, including local and global emissions, energy consumption, noise, environmental impact assessment and environmental protection	CENV6112	Coursework (noise and emissions calculations) and examination
A7. Transport Economics, from both theoretical and practical perspectives	CENV6016	Coursework (Cost-benefit Analysis and Road User Charging) and Examination
A8. Highway Engineering, including materials, structural design, maintenance and rehabilitation	CENV6171	Examination
A9. Current problems and new insights in transport planning and engineering.	All modules	As a requirement for successful assessment in all modules
A10. Transport data analysis methods and techniques, including statistical processes	CENV6124	Coursework (Data collection and analysis) and Examination
A11. Design processes and methodologies and their application to address transport-related problems and challenges.	CENV3065 FEEG3004 CENV6001 CENV6168	Coursework portfolio. Examination Examination Examination

	CENV6171	Junction design coursework and examination.
A12. The Transportation research process, through the completion of an individual project	FEEG6012	Individual project, leading to a Dissertation
A13. Information and communication technology relevant to the practice of Transportation Planning and Engineering	All modules	As a requirement for successful assessment in all modules
A14. Health and safety issues, risk assessment and regulatory frameworks.	CENV6168 FEEG6012	Examination Completion of H&S training and Risk assessments for fieldwork and Individual project
A15. The need for a high level of professional and ethical conduct in the transport industry, and the social and professional responsibilities of transport planners and engineers	Most modules	e.g. Coursework in CENV6001 (Mock Public Inquiry)
A16. The commercial and social context within which transport systems operate	Most modules	Examinations and coursework (e.g. Mock Public Inquiry)
Subject Specific Intellectual and Research Skills	Where Assessed (Examples)	How Assessed (Examples)
B1. Plan, conduct and report on an individual research programme.	FEEG6012	Individual project, leading to a Dissertation
B2. Analyse and produce transport plans, consistent with policy statements	CENV6169 CENV6001	Examination Examination
B3. Analyse and solve engineering problems, using appropriate mathematical methods as necessary.	CENV6171 FEEG3004 CENV3065 CENV6153	Coursework (Junction Design,) Examination Coursework Coursework/examination
B4. Be creative in the solution of problems and in design development	CENV6171 CENV3065 FEEG6012	Design coursework Coursework Dissertation
B5. Design engineering elements and systems to meet a need, evaluate critically and make improvements.	CENV6001 CENV6171 CENV6168 CENV3065	Examination Coursework Examination Coursework
B6. Integrate and evaluate knowledge, understanding, information and data from a variety	CENV6169	Coursework

of sources and disciplines.	CENV6001 CENV6168 CENV3065 FEEG6012	Public inquiry coursework Coursework Coursework Dissertation
B7. Identify and implement statistical techniques for analysing transport data, appropriate for the analysis requirements	CENV6124	Transport data coursework and examination
B8. Assess the limitations of a range of analysis tools and methods when applied in a transport context.	CENV3065 CENV6001 CENV6124 CENV6153	Coursework portfolio Examination Examination Examination
B9. Take a holistic approach to solving problems and designing systems, applying professional judgment to balance risks, cost, benefits, safety, reliability, aesthetics and environmental impact.	CENV6171 CENV3065 FEEG6012	Junction design coursework. Coursework The dissertation where it involves design.
B10. Assess the sustainability of transport planning and engineering schemes.	CENV3065 CENV6001 CENV6112 CENV6169	Coursework portfolio Examination Coursework and examination Examination
Transferable and Generic Skills		
C1. Communicate effectively – in writing, verbally and through drawings	All modules	Quality of writing, oral presentations and drawings in coursework
C2. Apply mathematical skills – algebra, geometry, modelling and analysis.	Most modules	Through mathematically-related coursework and examination questions
C3. Learn independently in familiar and unfamiliar situations with open-mindedness and in a spirit of critical enquiry.	Encouraged throughout the programme	Critical awareness and innovation are criteria in all assessments
C4. Work constructively as a member of a team.	CENV6001 CENV6016 CENV6124 CENV6171	Through team assignments in these modules

	CENV6112	
C5. Manage time and resources.	All modules	Through timely delivery of coursework and time management in examinations
C6. Use Information and Communications Technology in a transport context.	All modules	Through ICT-related aspects of coursework and examinations
C7. Use the library, internet and other sources effectively.	All modules	e.g. through quality of literature reviews in coursework and the Individual project
C8. Manage tasks and solve problems, transfer techniques and solutions from one area to another, apply critical analysis and judgment.	All modules	e.g. in most individual Projects (FEEG6012)
C9. Plan self-learning and improve performance, as the foundation for lifelong learning and CPD.	Not Assessed explicitly	N/A (note: Learning effectively on a Masters course provides the skills for lifelong learning and CPD).
C10. Plan and carry out a personal programme of work, adjusting this where appropriate to reflect changing circumstances	All modules	Students required to plan their work over the year in order to successfully complete their MSc. This is particularly important for their individual research project (FEEG6012).
C11. Exercise initiative and personal responsibility.	All modules	Not specifically assessed, but required for successful completion of all assessment tasks.
Subject Specific Practical Skills		
D1. Present and argue a case for and against a transport scheme	CENV6001	The Public Inquiry Coursework
D2. Analyse experimental results and assess their validity	CENV6124 CENV6171	In design exercises involving scenario testing and statistical

		testing of data.
D3. Prepare technical drawings and reports	CENV6171 CENV3065	In design coursework Coursework
D4. Give technical presentations using a variety of media	CENV6171 CENV6016 CENV6112 FEEG6012	Oral presentations for coursework
D5. Use computer packages to design and evaluate different aspects and features of transport systems.	CENV3065 CENV6153 CENV6171	Through coursework submissions
D6. Make effective use of scientific literature from various sources.	All modules	Through extent and quality of literature reviews and referencing

AHEP Learning Outcomes (AHEP LO)

The programme learning outcomes were mapped against the AHEP LOs, which include knowledge and understanding, qualities, skills and other attributes in the following areas of learning: science and mathematics; engineering analysis; design; economic, legal, social, ethical and environmental context; engineering practice; and additional general skills. These learning outcomes refer to the Subject Benchmark Statement for engineering (<https://www.gaa.ac.uk/docs/gaa/subject-benchmark-statements/sbs-engineering-15.pdf>), which is aligned with the Engineering Council publication Accreditation of Higher Education Programmes: UK Standard for Professional Engineering Competence (third edition) ([https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20\(1\).pdf](https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf))

	Learning Outcome
	Science and Mathematics
SM1	A comprehensive understanding of the relevant scientific principles of the specialisation
SM2 (m)	<i>Knowledge and understanding of mathematical and statistical methods necessary to underpin your education in civil engineering and to enable you to apply a range of mathematical and statistical methods, tools and notations proficiently and critically in the analysis and solution of engineering problems</i>
SM3 (m)	<i>Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of your own engineering discipline and the ability to evaluate them critically and to apply them effectively</i>
SM4	A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of civil engineering
SM5 (m)	<i>A comprehensive knowledge and understanding of mathematical and computational models relevant to civil engineering, and an appreciation of their limitations</i>
SM6	Understanding of concepts relevant to civil engineering, some from outside engineering, and the ability to evaluate them critically and to apply them effectively, including in engineering projects.
	Engineering analysis
EA1 (m)	<i>Understanding of engineering principles and the ability to apply them to undertake critical analysis of key engineering processes</i>
EA2 (m)	<i>Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques</i>
EA3	Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and to assess their limitations
EA4 (m)	<i>Understanding of, and the ability to apply, an integrated or systems approach to solving complex engineering problems</i>
EA5	Ability to use fundamental knowledge to investigate new and emerging technologies
EA6	Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods.
	Design
D1 (m)	<i>Understand and evaluate business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics</i>
D2 (m)	<i>Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards</i>
D3	Knowledge, understanding and skills to work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies

D4 (m)	<i>Apply advanced problem-solving skills, technical knowledge and understanding to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal</i>
D5 (m)	<i>Plan and manage the design process, including cost drivers, and evaluate outcomes</i>
D6 (m)	<i>Communicate your work to technical and non-technical audiences.</i>
D7	Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D8	Ability to generate an innovative design for products, systems, components or processes to fulfil new needs.
	Economic, legal, social, ethical and environmental context
EL1	Awareness of the need for a high level of professional and ethical conduct in engineering
EL2	Awareness that engineers need to take account of the commercial and social contexts in which they operate
EL3	Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of the particular specialisation
EL4	Awareness that engineering activities should promote sustainable development and ability to apply quantitative techniques where appropriate
EL5	Awareness of relevant regulatory requirements governing engineering activities in the context of the particular specialisation
EL6	Awareness of and ability to make general evaluations of risk issues in the context of the particular specialisation, including health & safety, environmental and commercial risk.
EL7 (m)	<i>Understanding of the key drivers for business success, including innovation, calculated commercial risks and customer satisfaction.</i>
	Engineering Practice
P1 (m)	<i>Understanding of contexts in which engineering knowledge can be applied (eg operations and management, application and development of technology, etc)</i>
P2	Advanced level knowledge and understanding of a wide range of engineering materials and components
P3 (m)	<i>Ability to apply relevant practical and laboratory skills</i>
P4 (m)	<i>Understanding of the use of technical literature and other information sources</i>
P5 (m)	<i>Knowledge of relevant legal and contractual issues</i>
P6 (m)	<i>Understanding of appropriate codes of practice and industry standards</i>
P7 (m)	<i>Awareness of quality issues and their application to continuous improvement</i>
P8 (m)	<i>Ability to work with technical uncertainty</i>
P9	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments
P10	Ability to apply engineering techniques taking account of a range of commercial and industrial constraints
P11	Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.
	Additional general skills
G1	Apply your skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G3	Monitor and adjust a personal programme of work on an on-going basis
G4	Exercise initiative and personal responsibility, which may be as a team member or leader.

Appendix 2:

Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme typically also have to pay for the items listed in the table below.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at www.calendar.soton.ac.uk.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Approved Calculators		Students may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University species permissible models from time to time and these may be purchased from any source.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). · The third year module FEEG3003 Individual Project requires you to print an AI portrait poster on paper. The typical cost for this is in the range £5 to £20.
Textbooks		Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source. Some modules suggest reading texts as optional background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.
Equipment and Materials	Design equipment and materials:	We provide a wide range of resources to support project based modules and activities and these will allow you to complete your assessed exercises to the highest standard. However, you may wish to customise your project by purchasing additional resource e.g. alternative manufacturing materials, electronic components, etc. You may also incur additional costs for printing e.g. large format drawings.
	Field Equipment and Materials:	For field trips, students will need to wear suitable clothing e.g. waterproofs and stout shoes. You can purchase these from any source.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Clothing	Fieldcourse clothing:	You will need to wear suitable clothing when attending fieldcourses, e.g. waterproofs, walking boots. You can purchase these from any source.
Printing and Photocopying Costs		In some cases, coursework and/or projects may be submitted electronically. Where it is not possible to submit electronically students will be liable for printing costs. Students are expected to cover the costs associated with the printing of drawings and graphic presentations. These are typically expected to be of the order of £20 - 50 per student. The third year module FEEG3003 Individual Project requires you to print an AI portrait poster on paper at a typical cost of £20.
Optional Visits (e.g. museums, galleries)		Some modules may include additional optional visits. You will normally be expected to cover the cost of travel and admission, unless otherwise specified in the module profile. For costs related to study abroad please see the relevant module profile.
Travel and Subsistence		For additional costs related to travel and subsistence for the Industrial Placement Year, please refer to the module profile for FEEG 3009