PROGRAMME SPECIFICATION	

1	**Awarding Institution**	Newcastle University
2	**Teaching Institution**	Newcastle University
3	**Final Award**	MSc
4	**Programme Title**	Intelligent Transport System
5	**Programme Code**	5187F/5187P
6	**Programme Accreditation**	CILT, JBM (ICE, IStructE, IHIE, CIHT), TPPQ
7	**QAA Subject Benchmark(s)**	Engineering
8	**FHEQ Level**	7
9	**Last updated**	June 2012

10 Programme Aims

The programme aims:
1) To produce postgraduates who have a systematic understanding of ITS (Intelligent Transport Systems) and Intelligent Mobility, and a critical awareness of current problems in the field, informed by the latest research carried out at the University and elsewhere.
2) To give postgraduates a comprehensive understanding of appropriate techniques to enable them to apply this understanding practically, to the planning, management and operation of transport systems with appropriate professional skills;
3) To convert good honours graduates in associated disciplines into marketable postgraduates with transferable skills who should be able to pursue a career in transportation in either the private or public sector;
4) To provide opportunities for candidates to develop subject-specific skills, cognitive skills, a range of transferable skills and practical skills;
5) o offer experience in the planning and execution of an extended research project in the form of a dissertation; and
6) To provide a qualification which meets the designated learning outcomes at level 7 of the FHEQ.
7) To provide a programme that meets the accreditation requirements of the Joint Board of Moderators (JBM www.jbm.org.uk) for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng(Hons) or an Accredited IEng (Full) BEng/BSc (Hons) undergraduate first degree.
8) To provide a programme that meets the accreditation requirements for the Transport Planning Professional (TPP) qualification, administered by the Chartered Institution of Highways and Transportation (CIHT) on behalf of the CIHT and the Transport Planning Society (TPS).
9) To provide a programme designed to achieve the EC^{UK} Output Standards for Accredited Engineering Programmes and take account of the QAA's FHEQ Qualification Descriptors, the QAA Subject Benchmark Statement for Engineering, and the University's Graduate Skills Framework.

EC^{UK} Output Standards for Accredited Engineering Programmes:
http://www.engc.org.uk/ecukdocuments/internet/document%20library/AHEP%20Brochure.pdf
QAA's FHEQ Qualification Descriptors:
http://www.qaa.ac.uk/AssuringStandardsAndQuality/Qualifications/Pages/default.aspx
QAA Subject Benchmark Statement for Engineering:
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Subject-benchmark-statement-Engineering-.aspx
University's Graduate Skills Framework:
http://www.ncl.ac.uk/quilt/modules/gsf.htm

11 Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have references to the benchmark statements.

Knowledge and Understanding

On completing the programme students should have gained and be able to demonstrate knowledge and understanding of:

A1. The advanced theoretical concepts and analytical tools of transport engineering, the policy behind implementing ITS and Intelligent Mobility, and practical aspects of implementing such systems.
A2. The transport issues that confront modern society and of the global and national settings in which transport activities take place.
A3. Appropriate research techniques that provide:
(i) a basic understanding of statistical analysis ;
(ii) an advanced knowledge of appropriate spread-sheet software; and
(iii) the basic skills needed to prepare a research dissertation.
A4. Selected areas of specialist study related to ITS, Intelligent Mobility and sustainable development.
A5. A transport-related subject through a supervised period of extended study, providing a deeper understanding than that made possible by following a taught programme of study.
A6. Undertaking research, analysis or design processes given an appropriate level of supervision.
A7. Applications of IT to the selected fields of study.
A8. Management principles including professional, ethical and safety responsibilities.

Teaching and Learning Methods

Acquisition of A1 and A2 is through a combination of lectures, seminars, tutorials, demonstrations, computer laboratory activities and visiting lecturers from industry. Outcome A3 is achieved by lectures, computer practicals and preparation and oral presentation of a research brief. A4 is achieved through a combination of lectures, seminars, tutorials, demonstrations, computer laboratory activities and visiting lecturers from industry for specialist areas of study. Acquisition of A5 and A6 is through literature reviews, data acquisition, analysis and interpretation and the preparation of a research dissertation. Outcome A7 is achieved by lectures, tutorials and where appropriate, hands-on computer exercises. Lectures, course notes and research studies teach the broader professional outcomes A8.

Assessment Strategy

Formative assessment occurs through tutorial examples and coursework. The primary means of assessing factual knowledge is the closed book unseen examination. This is supported by assessed coursework and case studies, which involve both written and oral presentations. In-depth individual learning frequently forms part of the project, which is assessed by dissertation.

Intellectual Skills

On completing the programme students should be able to:

B1. Select and apply appropriate analytical tools for modelling and assessing relevant problems.
B2. Use engineering and operational principles in the development of solutions to practical problems.
B3. Select and apply appropriate computer-based methods for modelling and analysing problems in transport.

B4. Set clear objectives, assemble, process and analyse information relevant to a specialist subject, interpret and form judgements from the collected evidence and express reasoned conclusions which make a contribution to the subject.
B5. Collect and analyse field data using basic statistical techniques and interpretation together with appropriate software.
B6. Produce solutions to problems through the application of engineering knowledge and understanding.
B7. Undertake technical risk evaluation.

Teaching and Learning Methods

Where appropriate B.1-B.2 are reinforced in lectures, but learning is principally in tutorials and assignments. Outcome B.3 is initially encountered in compulsory lectures and practical classes, but is developed principally during specialist modules and research dissertations. The acquisition of B.4 and B.5 occurs through the compulsory research dissertation and Research Methods courses, but also occurs in specialist modules. B.6 is introduced in lectures and developed through tutorials, seminars, case studies and the research dissertation. Outcome B.7 is included in some specialist lectures but is primarily taught on an individual basis as part of the dissertation supervision.

Assessment Strategy

Unseen and open-book examinations are used to assess intellectual abilities. Assessed coursework provides further opportunities to demonstrate intellect and ability. The project, which is assessed by dissertation, and provides evidence of the ability to carry out a research project.

Practical Skills

On completing the programme students should be able to:
C1. Use relevant test and measurement equipment.
C2. Carry out Computing Laboratory work.
C3. Plan, execute and report a research project.
C4. Use transport engineering IT tools.
C5. Search and retrieve information and develop ideas further.
C6. Present and defend economic and social arguments on issues of topical interest.
C7. Interpret and critically evaluate the results of empirical research in transport.

Teaching and Learning Methods

Outcomes C.1-C.3 are acquired principally through the research dissertation but are also taught in the Research Methods and specialist modules. Acquisition of C.4 is initially through lectures, developed through hand-on exercises and assignments. C.5 is introduced through the Research Methods module but the research dissertation is the principal vehicle for acquisition. C.6 and C.7 are taught through lectures, seminars, tutorials, oral presentations, and hands-on computer experience gained through the compulsory and specialist modules.

Assessment Strategy

Outcomes C.1-C.7 are not explicitly assessed, but are necessary to successfully complete coursework and project requirements. Participants also carry out a significant level of self-assessment, which is encouraged during tutorials, seminars, etc. Summative assessment is through individual and group assignments, presentations and examinations.

Transferable/Key Skills

On completing the programme students should be able to:
D1. Manipulate and present relevant primary and secondary data in a variety of ways.
D2. Use scientific evidence-based methods in the solution of problems.
D3. Create and innovate in the solution of problems.
D4. Effectively communicate with specialist and non specialist audiences.
D5. Work independently and in teams in a range of situations, preparing for life-long learning.
D6 Efficiently use general IT skills
D7 Manage time and resources, plan laboratory-based programmes, assess hazards and risks and work safely
D8 Exercise initiative and personal responsibility
D9. Support a self-motivated learning style.
D10. Support a self-awareness to the extent of recognising his or her own limitations and knowing when to seek help.

Teaching and Learning Methods

Outcomes D.1-D.10 permeate through all teaching and learning activities. D.1, D.3, D.8-D.10 are particularly relevant to the research dissertation.

Assessment Strategy

Skills D.1-D.10 are essential to complete examination and assignments to a satisfactory standard. Outcomes D.1-D.4, D.9 and D.10 are essential to satisfactorily complete the dissertation.

12 Programme Curriculum, Structure and Features

Basic structure of the programme

Every M.Sc. student studies 180 credits over the academic year. The taught courses, comprising 100 credits, are taught in Semesters 1 and 2, and the 80 credits associated with the dissertation are notionally allocated to part of the second semester and the summer period.

Key features of the programme (including what makes the programme distinctive)

The M.Sc. year occupies the full 12-month period, with the summer period (June-August) available for students to use for the research dissertation element of the degree. Alternative arrangements can be made for part-time study usually over two or three years. The programme also allows students to start in the second semester.
The taught modules are delivered generally in a blocked format. A week of study is usually followed by a week of private study allowing time for assimilation, reflective learning and completion of formative coursework.
After completion of the taught material and examinations, students undertake a field trip to France and Germany (or elsewhere as circumstances allow), to see how transport systems operate in less familiar environments, and hear lectures and presentations on transport research and practice in a contrasting context.
Students are expected to commence planning their dissertation early in the academic year, making a presentation of their research brief early in the second semester. This encourages good progress and once fulltime work on the dissertation commences after the field trip, deeper research can be undertaken.
The degree programme is supplemented by research seminars, site visits and engagement with local industry and practitioners through professional institutions.

Programme regulations (link to on-line version)

http://www.ncl.ac.uk/regulations/programme/

13 Criteria for admission

Entry qualifications

A minimum of a second-class Honours degree, or an international equivalent, in an engineering, science or related subject.

Admissions policy/selection tools

Upon receipt of a completed application form via the electronic E2R system, eligible and suitably qualified candidates are made automatic conditional or unconditional offers of places by the PG Admissions team in Kings Gate. Overseas qualifications are assessed by the PG Admissions team in Kings Gate using the database set up by the international office, supported also by NARIC http://www.naric.org.uk/. Where uncertainty exists applications are referred to the Degree Programme Director (DPD). The DPD invites all UK-based applicants to visit the School for an introduction to the Programme and tour of our facilities. Applicants not based in the UK are not required to attend an interview. Decisions are based on qualifications, references, any relevant work experience, and the applicants' personal statements.

Non-standard Entry Requirements
Candidates without the typical qualifications will be considered, especially those with relevant professional experience, but there is no Diploma entry route.

Additional Requirements

Level of English Language capability
IELTS 6.5 (or equivalent) with at least 6 in each component.

14 Support for Student Learning

The Student Services portal provides links to key services and other information and is available at: https://my.ncl.ac.uk/students/

Induction
During the first week of the first semester students attend an induction programme. New students will be given a general introduction to University life and the University's principle support services and general information about the School and their programme, as described in the Degree Programme Handbook. New and continuing students will be given detailed programme information and the timetable of lectures/practicals/labs/ tutorials/etc. The International Office offers an additional induction programme for overseas students.

Study skills support
Students will learn a range of Personal Transferable Skills, including Study Skills, as outlined in the Programme Specification. Some of this material, e.g. time management is covered in the appropriate Induction Programme. Students are explicitly tutored on their approach to both group and individual projects.

Numeracy support is available through Maths Aid and help with academic writing is available from the Writing Centre (further information is available from the Robinson Library).

Academic support
The initial point of contact for a student is with a lecturer or module leader, or their tutor (see below) for more generic issues. Thereafter the Degree Programme Director or Head of School may be consulted. Issues relating to the programme may be raised at the Staff-Student Committee, and/or at the Board of Studies.

Pastoral support
All students are assigned a personal tutor whose responsibility is to monitor the academic performance and overall well-being of their tutees. In addition the University offers a range of support services, including one-to-one counselling and guidance or group sessions / workshops on a range of topics, such as emotional issues e.g. Stress and anxiety, student finance and budgeting, disability matters etc. There is specialist support available for students with dyslexia and mental health issues. Furthermore, the Union Society operates a Student Advice Centre, which can provide advocacy and support to students on a range of topics including housing, debt, legal issues etc.

Support for students with disabilities
The University's Disability Support Service provides help and advice for disabled students at the University - and those thinking of coming to Newcastle. It provides individuals with: advice about the University's facilities, services and the accessibility of campus; details about the technical support available; guidance in study skills and advice on financial support arrangements; a resources room with equipment and software to assist students in their studies.

Learning resources
The University's main learning resources are provided by the Robinson and Walton Libraries (for books, journals, online resources), and Information Systems and Services, which supports campus-wide computing facilities.

All new students whose first language is not English are required to take an English Language Proficiency Test. This is administered by INTO Newcastle University Centre on behalf of Newcastle University. Where appropriate, in-sessional language training can be provided. The INTO Newcastle University Centre houses a range of resources which may be particularly appropriate for those interested in an Erasmus exchange.

15 Methods for evaluating and improving the quality and standards of teaching and learning

Module reviews
All modules are subject to review by questionnaires which are considered by the Board of Studies (BoS). Changes to, or the introduction of new, modules are considered at the BoS and/or the School Learning, Teaching and Student Experience Committee (SLTSEC). Student opinion is sought at the Staff-Student Committee (SSC) and/or the BoS. New modules and major changes to existing modules are subject to approval by the Faculty Learning, Teaching and Student Experience Committee (FLTSEC).

Programme reviews
The BoS conducts an Annual Monitoring and Review of the degree programme and reports to FLTSEC. The FLTSEC takes an overview of all programmes within the Faculty and reports any Faculty or institutional issues to the University Learning, Teaching and Student Experience Committee (ULTSEC).

External Examiner reports
External Examiner reports are considered by the BoS. The Board responds to these reports through FLTSEC. External Examiner reports are shared with institutional student representatives, through the SSC.

Student evaluations
All modules, and the degree programme, are subject to review by student questionnaires. Informal student evaluation is also obtained at the SSC, and the BoS. The results from student surveys are considered as part of the Annual Monitoring and Review of the programme and any arising actions are captured at programme and School / institutional level and reported to the appropriate body.

Mechanisms for gaining student feedback
Feedback is channelled via the SSC and the BoS.

Faculty and University Review Mechanisms
The programme is subject to the University's Internal Subject Review process. Every five years degree programmes in each subject area are subject to periodic review. This involves both the detailed consideration of a range of documentation, and a two-day review visit by a review team which includes an external subject specialist in addition to University and Faculty representatives. Following the review a report is produced, which forms the basis for a decision by ULTSEC on whether the programmes reviewed should be re-approved for a further five year period.

Accreditation reports
At the date of publication, the continuation of accreditation by the Joint Board of Moderators (Institution of Civil Engineers, Institution of Structural Engineers, Chartered Institution of Highways and Transportation, and the Institute of Highway Incorporated Engineers) as meeting the requirements for Further Learning for a Chartered Engineer (CEng) for candidates who have already acquired an Accredited CEng (Partial) BEng (Hons) or an Accredited IEng (Full) BEng/BSc (Hons) undergraduate first degree, is pending final approval (July2012). See www.jbm.org.uk for further information.

The degree programme is also recognised as an Approved Masters Degree for candidates seeking the Transport Planning Professional Qualification.

Additional mechanisms

16 Regulation of assessment

Pass mark
The pass mark is 50%

Course requirements
Progression is subject to the University's Masters Degree Progress Regulations, Taught and Research and Examination Conventions for Taught Masters Degrees. Limited compensation up to 20 credits of the taught element and down to a mark of 40% is possible and there are reassessment opportunities, with certain restrictions.

The University employs a common marking scheme, which is specified in the Taught Postgraduate Examination Conventions, namely:

Summary description applicable to postgraduate Masters programmes	
<50	Fail
50-59	Pass
60-69	Pass with Merit
70 or above	Pass with Distinction

Role of the External Examiner
An External Examiner, a distinguished member of the subject community, is appointed by FLTSEC, following recommendation from the BoS. The External Examiner is expected to:

i. See and approve assessment papers
ii. Moderate examination and coursework marking
iii. Attend the Board of Examiners
iv. Report to the University on the standards of the programme

In addition, information relating to the programme is provided in:

The University Prospectus: http://www.ncl.ac.uk/postgraduate/

The School Website: http://www.ncl.ac.uk/ceg/study/postgraduate/taught/index.htm

Degree Programme and University Regulations: http://www.ncl.ac.uk/regulations/docs/

The School Handbook: https://ce-gs14.ncl.ac.uk/CeG.Internal/teaching/handbooks/2011-2012/CeG%20School%20Handbook.PDF

The Degree Programme Handbook: https://ce-gs14.ncl.ac.uk/CeG.Internal/teaching/handbooks/2011-2012/EE%20Handbook.pdf

The Module Catalogue: http://www.ncl.ac.uk/module-catalogue/

Please note. This specification provides a concise summary of the main features of the programme and of the learning outcomes that a typical student might reasonably be expected to achieve if she/he takes full advantage of the learning opportunities provided. The accuracy of the information contained is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

Annex

Mapping of Intended Learning Outcomes onto Curriculum/Modules

		Intended Learning Outcomes			
Module	**Type**	**A**	**B**	**C**	**D**
CEG8401	C	1, 2, 3, 4, 5, 6, 7, 8.	1, 3, 5.	1, 2, 3, 4, 5, 7.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8402	C	1, 2, 3, 8.	2, 6.	1, 3, 5, 6.	1, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8406	C	1, 2, 6, 8.	3, 5, 6.	2, 4, 7.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8407	C	1, 2, 4, 7.	1, 2, 3.	2, 4.	1, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8410	C	1, 2.	2, 6, 7.	5.	1, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8412	C	1, 2, 4, 7.	2, 6.	1, 7.	1, 4, 5, 6, 7, 8, 9, 10.
CEG8413	C	1, 2, 8.	1, 3, 5, 6.	1, 4, 7.	1, 4, 5, 6, 7, 8, 9, 10.
CEG8414	C	1, 2, 4, 6, 7.	1, 2, 3, 4, 5, 6.	4, 5, 6.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8415	C	1, 2, 4, 6, 7.	1, 2, 3, 4, 5, 6.	4, 5, 6.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8417	C	3.	5.	5, 7.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
CEG8499	C	3, 5, 6, 7, 8.	1, 2, 3, 4, 5, 6, 7.	2, 3, 4, 5, 6, 7.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10.