School of Computer Science

General degree students wishing to enter 3000-level modules and non-graduating students wishing to enter 3000-level or 4000-level modules must consult with the relevant Honours Adviser within the School to confirm they are properly qualified to enter the module.

Computer Science (CS) modules

CS3051 Software Engineering				
SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module gives a broad overview of software engineering, presenting the fundamental aspects as a collaborative professional activity including its concerns and approaches. Students learn to apply a number of different software engineering methods and practices, and to match their choice of method to the problem at hand and the context in which a project is undertaken. The module provides the background and practical experience for students to enter professional careers where they will be working on large-scale software projects in teams.				
Programme module type:	Compulsory for Computer Science BSc, Joint Computer Science degrees with subjects other than Psychology with BPS Recognition, Computer Science MSci Optional for Computer Science and Psychology with BPS Recognition BSc			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3052 Computational Complexity

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces Turing machines, non-determinism and pushdown automata, followed by study of decidability, simulation and the Halting problem. It builds upon finite state machines, context-free grammars and big-O notation from second year. The complexity classes P, NP, co-NP, NP-hard, etc., are described via analysis of SAT and graph isomorphism. Strengths and limitations of the abstract approach to complexity are discussed, followed by an in-depth introduction to practical complexity: flops, worst- and average-case analysis, approximate solutions, and case studies.				
Programme module type:	Compulsory for Computer Science BSc, Joint Computer Science degrees with subjects other than Psychology with BPS Recognition, Computer Science MSci Optional for Computer Science and Psychology with BPS Recognition BSc			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002	Anti-requisite(s):	MT3852	
Required for:	CS4052, CS4204			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours	**Guided independent study:** 122 hours		
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3098 Minor Software Team Project

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	Whole Year
Academic year:	2016/7 & 2017/8			
Availability restrictions:	Not available to General Degree Students.			
Planned timetable:	To be arranged.			
This module allows students to take part in a substantial software engineering project as part of a team, using professional development techniques. Each team specifies, plans, designs, implements and documents a medium-sized software system, under the guidance of a member of staff. Cooperation within and between teams is essential in order to produce successful solutions. This module has a similar structure to CS3099, but with reduced scope appropriate for Joint Honours students.				
Programme module type:	Compulsory for Computer Science Joint Honours Degrees.			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002	**Anti-requisite(s):**	CS3099	
Required for:	CS4098			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, supervisor meetings and demonstrations arranged as necessary			
	Scheduled learning: 69 hours	**Guided independent study:** 81 hours		
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3099 Major Software Team Project

SCOTCAT Credits:	30	SCQF Level 9	**Semester:**	Whole Year
Academic year:	2016/7 & 2017/8			
Availability restrictions:	Not available to General Degree Students			
Planned timetable:	To be arranged.			
This module allows students to take part in a substantial software engineering project as part of a team, using professional development techniques. Each team specifies, plans, designs, implements and documents a medium-sized software system, under the guidance of a member of staff. Cooperation within and between teams is essential in order to produce successful solutions.				
Programme module type:	Compulsory for Computer Science BSc, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	CS3098
Required for:	CS4099			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, supervisor meetings and demonstrations arranged as necessary.			
	Scheduled learning: 69 hours		**Guided independent study:** 231 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3101 Databases

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces data models and modeling techniques, relational design and normalisation. It also examines a range of issues in database implementation, including indexing, query processing, transactions and recovery.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3102 Data Communications and Networks

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces the basics of data communications and computer networks, and examines network protocols and architectures.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101), CS2002 and CS2003		**Anti-requisite(s):**	CS5021
Required for:	CS4103, CS4302			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3104 Operating Systems

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module examines the changing role of the operating system, the concept and implementation of process, the OS/hardware interface with regard to storage and protection, and the techniques developed to achieve safety and throughput in multitasking systems.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Required for:	CS4202, CS4204			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3105 Artificial Intelligence

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module examines the general features of the A.I. problem solving process, and in particular the various forms of heuristic, together with their implementation and case studies of real systems.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	CS5010
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3106 Human Computer Interaction

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module covers the main aspects of Human Computer Interaction. Design guidelines, structured design methods and standards are studied, and practice is given in implementation and evaluation. Students gain experience of current interactive audio, visual and manipulative technologies.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	CS5040
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3301 Component Technology

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module provides students with understanding of current and emerging component technologies, focusing on the major themes of object-oriented and message-oriented middleware. The first theme examines the evolution of object-oriented programming into component models such as CORBA, COM, RMI and Java Beans. The second theme explores the emerging field of message-oriented middleware and of service-oriented computing models such as SOAP and REST.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101), CS2002 and CS2003			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS3302 Data Encoding

SCOTCAT Credits:	15	SCQF Level 9	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module explains the techniques used to encode data, emphasising the ideas of security and secrecy, error correcting capabilities, and data compression.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4052 Logic and Software Verification

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
Building on earlier coverage of elementary logic, this module motivates the need for formal methods and software verification approaches as model checking for guaranteeing the correctness of software systems. The module covers modelling, system property specification using temporal logics, and more applied approaches to software specification and verification through the use of model checkers. Model checkers such as SPIN and UPPAAL are used both in lectures and in practical work. Petri nets and program semantics are also explored. Software correctness is thus presented as a matter not of testing but of pre-–execution verification through model checking.				
Programme module type:	Compulsory for Computer Science BSc, Joint Computer Science degrees with subjects other than Psychology with BPS Recognition, Computer Science MSci Optional for Computer Science and Psychology with BPS Recognition BSc			
Pre-requisite(s):	CS3052			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4098 Minor Software Project

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	Whole Year
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module has the same content as CS4099, but with reduced scope appropriate for Joint Honours students.				
Programme module type:	Compulsory for Joint Computer Science degrees.			
Pre-requisite(s):	CS3098		**Anti-requisite(s):**	CS4099, CS4796
Learning and teaching methods and delivery:	**Weekly contact**: Individual supervision			
	Scheduled learning: 69 hours		**Guided independent study:** 81 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4099 Major Software Project

SCOTCAT Credits:	30	SCQF Level 10	**Semester:**	Whole Year
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module allows students to undertake a substantial software engineering project using professional development techniques. Each student designs, specifies and constructs a medium-sized software system, or undertakes a formal development and proof of such a system, under the guidance of a member of staff. The syllabus is designed on an individual basis.				
Programme module type:	Compulsory for Computer Science BSc, Computer Science MSci			
Pre-requisite(s):	CS3099		**Anti-requisite(s):**	CS4098, CS4796
Learning and teaching methods and delivery:	**Weekly contact**: Individual supervision.			
	Scheduled learning: 69 hours		**Guided independent study:** 231 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4102 Computer Graphics

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module covers the fundamental concepts of computer graphics, and develops the ability to apply the concepts to the generation of realistic, synthetic images of 3D objects and scenes. On completion of the module, students should be competent to undertake many tasks in computer graphics, and should have an understanding of the theory underlying many of the relevant techniques.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4103 Distributed Systems

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module covers the fundamentals of distributed systems, with reference to system models, programming languages, algorithmic techniques, concurrency and correctness.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3102			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4201 Programming Language Design and Implementation

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module studies the design and implementation of programming languages. Topics include language design principles, abstract syntax, evaluation mechanisms, binding, type systems, polymorphism, data encapsulation, exceptions, formal definition of programming languages, compiling techniques, abstract machine design, run-time systems and garbage collection.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4202 Computer Architecture				
SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module studies the principles and technology of modern computer architectures, with particular emphasis on performance and acceleration. Topics include the CPU, memory, interconnect architectures, performance concepts and programming models.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3104			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4203 Computer Security				
SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces the basic concepts of computer security and cryptography, common attacks and defences against them, and relevant legal and policy frameworks.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	IS5104
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4204 Concurrency and Multi-Core Architectures

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module presents the key concepts of programming multi-core/many-core and other parallel architectures, ranging from the identification and use of parallel patterns; the use of structured parallelism to implement task and data parallelism; key implementation issues, including task identification, granularity, scheduling, threads, garbage collection, task placement, locality; performance monitoring and debugging.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3052 and CS3104			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4302 Multimedia

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces the concepts of analogue and digital media, and analyses techniques for encoding, manipulating, compressing, and transmitting media based on text, audio, images, and moving images, as well as their connection with human perception. Within the context of networked multimedia, it presents issues and solutions involved in transporting time-sensitive data across computer networks.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3102			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4303 Video Games

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module builds on the general-purpose programming abilities acquired earlier, introducing games-specific techniques and material. Computer games are now a bigger industry than films, yet they are continuing to develop. While the budget for a new game may rival that of a Hollywood blockbuster, there is also a growing demand for lower octane coffee-break games that can be accessed for short periods in a browser, and for games that can be played on-the-go with a mobile device. Games programming skills are developed through lectures and laboratories, culminating in the creation of actual games.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4402 Constraint Programming

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces constraint-based reasoning as a powerful mechanism for knowledge representation and inference. It provides a thorough grounding in the constraint satisfaction/constrained optimisation problem formalism, and covers both basic techniques for implementing constraint solvers and the use of advanced techniques with a modern solver.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures (x 11 weeks) and fortnightly tutorial.			
	Scheduled learning: 28 hours		**Guided independent study:** 122 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4499 Computer Science (Special Subject)

SCOTCAT Credits:	15	SCQF Level 10	**Semester:**	1 or 2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module is a guided reading module on any aspect of Computer Science not covered by other available modules, intended only for students in the School of Computer Science for whom exceptional timetable arrangements (such as a semester or year of absence) unduly restrict the availability of modules.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	The consent of the Head of School			
Learning and teaching methods and delivery:	**Weekly contact**: 1-hour supervision meeting.			
	Scheduled learning: 11 hours		**Guided independent study:** 139 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk			

CS4796 Joint Project (30cr)

SCOTCAT Credits:	30	SCQF Level 10	**Semester:**	Whole Year
Academic year:	2016/7 & 2017/8			
Availability restrictions:	Available only to students in the Second year of the Honours Programme, who have completed the Letter of Agreement. No student may do more than 60 credits in Dissertation or Project modules.			
Planned timetable:	To be arranged.			
The aim of the project is to develop and foster the skills of experimental design, appropriate research management and analysis. The topic and area of research should be chosen in consultation with the supervisors in order to determine that the student has access to sources as well as a clear plan of preparation.				
Programme module type:	Optional for Joint Honours in the School of Computer Science.			
Pre-requisite(s):	A Letter of Agreement		**Anti-requisite(s):**	CS4098, CS4099, More than 30 credits in other dissertation / project modules
Learning and teaching methods and delivery:	**Weekly contact**: As per Letter of Agreement.			
	Scheduled learning: hours		**Guided independent study:** hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	As per Letter of Agreement.			

CS5010 Artificial Intelligence Principles

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module covers foundational knowledge of Artificial Intelligence (AI). The module gives an overview of AI and its philosophy. It covers fundamental principles in AI: logical reasoning, reasoning in the presence of uncertainty, and machine learning. It shows how search is used to solve a variety of problems in AI. Notions such as agency and uncertainty in AI are covered. Finally, the philosophy of AI in practice and the philosophical problems in AI are shown.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	CS3105
Required for:	CS5011			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5011 Artificial Intelligence Practice

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module covers practical design and implementation of Artificial Intelligence (AI). It provides grounding in AI technique, covering techniques in the areas of AI reasoning, planning, doing, and learning. Finally, it is shown how to implement AI ideas in software and how to evaluate such implementation.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	Students must have passed CS3105 or CS5010, or be currently taking CS5010			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5012 Language and Computation

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module covers the major aspects of natural language processing and speech understanding, including computational syntax, computational semantics, discourse processing, machine translation and speech recognition.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3052 or CS5010			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5021 Advanced Networks

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7			
Planned timetable:	To be arranged.			
This module looks forward to new concepts and topics in networking, and also reviews key abstractions including layered models, protocols and Internet architecture, and key concerns such as reliability, resource utilization and quality of service. Specific networking technologies are used to demonstrate monitoring, measurement and analysis of real traffic.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	CS3102
Required for:	CS5023, CS5029			
Learning and teaching methods and delivery:	**Weekly contact**: Weekly lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 40%, Practical Examinations = 0%, Coursework = 60%			
	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%			
Re-Assessment pattern:	2-hour Written Examination = 40%, Existing Coursework = 60%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5023 Mobile and Wireless Networks

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7			
Planned timetable:	To be arranged.			
This module examines how computing and communication are used to allow mobile systems to function in heterogeneous environments, with variations in available network resources and diverse/intermittent network connectivity. A key outcome of the module is for students to be able to critically assess the capabilities and constraints of mobile systems.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3102 or CS5021			
Learning and teaching methods and delivery:	**Weekly contact**: Weekly lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5030 Software Engineering Principles

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module examines the key concepts in small and large-scale software development. Project management is explored, along with the processes involved in developing system requirements, functionality and high-level descriptions necessary to guide the development of, and assess, a working system.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5031 Software Engineering Practice

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			

This module introduces advanced software engineering methods supporting the development of complex, composite software systems with an emphasis on software configuration management, reuse and test-driven development practices. It examines software reuse at different levels of scale, from software libraries and components to service-oriented architectures and discusses how reuse presents both challenges and opportunities for the development of quality software. A key process in today's software engineering practice is testing; the module introduces testing methods that complement the different scales of reuse-oriented development, from unit-level testing to integration testing and system-level testing. Students work on a project to design, implement and test a complex, distributed application to put the content of the lectures into practice. Reference is made to the content of the co-requisite Software Engineering Principles module where appropriate, so that students learn how the practices studied fit into a larger software engineering lifecycle.

Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci	
Pre-requisite(s):	(CS2001 or CS2101) and CS2002	
Required for:	CS5032, CS5033, CS5039	
Learning and teaching methods and delivery:	**Weekly contact**: Weekly lectures, seminars, tutorials and practical classes.	
	Scheduled learning: 25 hours	**Guided independent study:** 125 hours
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%	
	As used by St Andrews: Coursework = 100%	
Re-Assessment pattern:	No Re-Assessment available	
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk	

CS5032 Critical Systems Engineering

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module provides students with an understanding of the concepts and development techniques used for critical, socio-technical systems. On completion they will understand the notion of system dependability, the key characteristics of dependable systems, and the specialised software engineering techniques that may be used to ensure dependable system operation. Students also gain practical experience of applying some of these techniques in systems specification, design or implementation.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: Weekly lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5033 Software Architecture

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module introduces students to the concept of software architecture, as an aid to software design, reuse and evolution. When students have completed this module, they will: have knowledge of the key elements of software architectures; recognise architectural styles of existing software systems; be able to describe the software architecture of a non-trivial system accurately; be able to construct systems that satisfy an architectural description; understand how software architecture aids design, reuse and evolution of software.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	CS3051 or CS5031			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 25 hours		**Guided independent study:** 125 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5040 Human Computer Interaction Principles and Methods

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module provides a grounded introduction to the principles of human computer interaction in the context of evaluation paradigms. Material includes: history of interfaces and interaction; the human (vision, perception, memory, hearing); the computer (from existing to next generation ubiquitous computing systems); paradigms of interaction; evaluation paradigms in HCI; guidelines and heuristics; experimental design and hypothesis testing in HCI; quantitative evaluation methods in HCI; qualitative evaluation methods in HCI.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science Msci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002		**Anti-requisite(s):**	CS3106
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, practical classes and tutorials.			
	Scheduled learning: 41 hours		**Guided independent study:** 109 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5041 Interactive Software and Hardware

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	1
Academic year:	2016/7 & 2017/8			
Availability restrictions:	The module is available to all students enrolled on the MSc Human Computer Interaction Programme. A quota for other students may be necessary due to lab equipment constraints, in which case preference will be given to other MSc students.			
Planned timetable:	To be arranged.			
This module develops prototype-building skills for a wide range of interactive technologies. Students learn how to create interactive hardware and software using technologies such as tangible programming kits, mobile devices, microprocessor kits and depth cameras. There is a strong emphasis on practical assignments.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, practical classes and tutorials.			
	Scheduled learning: 66 hours		**Guided independent study:** 84 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%			
	As used by St Andrews: Coursework = 100%			
Re-Assessment pattern:	No Re-Assessment available			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5042 User-Centred Interaction Design

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Availability restrictions:	The module is available to all students enrolled on the MSc Human Computer Interaction Programme. A quota for other students may be necessary due to lab equipment constraints, in which case preference will be given to other MSc students.			
Planned timetable:	To be arranged.			
This module studies methodologies in interaction design that are at the core of current practice for user interface engineering and application development. Students work towards creating designs of interactive systems that are based on human, group and organisation needs rather than on technical constraints. The module does not involve a great deal of programming.				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science Msci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 2 lectures, 3 practicals and 1 tutorial.			
	Scheduled learning: 66 hours		**Guided independent study:** 84 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 15%, Coursework = 85%			
	As used by St Andrews: Coursework = 85%, Presentation = 15%			
Re-Assessment pattern:	No Re-assessment available			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5044 Information Visualisation and Visual Analytics

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			
This module provides an introduction to information visualisation and visual analytics. It focuses on the question of how to utilise visual representations to make information accessible for exploration and analysis. The module covers basic principles of visualisation design and interaction principles. It introduces a range of visualisation techniques and tools, and discusses how these can be effectively applied in various scenarios for communication, exploration and analysis, and how to evaluate information visualisations in different contexts. Skills in designing, developing, and evaluating information visualisations are reinforced through practical assignments. There are no pre-requisites for this module but students should have basic programming skills (e.g. in Java or JavaScript).				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Pre-requisite(s):	(CS2001 or CS2101) and CS2002			
Learning and teaching methods and delivery:	**Weekly contact**: 3-hour lecture (x 11 weeks), 1-hour seminar (x 8 weeks)			
	Scheduled learning: 41 hours		**Guided independent study:** 109 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 40%, Practical Examinations = 0%, Coursework = 60%			
	As used by St Andrews: 2-hour Written Examination = 40%, Coursework = 60%			
Re-Assessment pattern:	2-hour Written Examination = 40%, Existing Coursework = 60%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			

CS5052 Data-Intensive Systems

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Academic year:	2016/7 & 2017/8			
Planned timetable:	To be arranged.			

The era of big data is upon us - the volume, velocity and variety of enterprise and scientific data are growing at an exponential rate and will continue to do so for the foreseeable future. This module presents the programming paradigms, algorithmic techniques and design principles for large-scale distributed systems, such as those utilised by companies such as Google, Amazon and Facebook. This module is different in scope from CS4103 (distributed systems) as it focuses primarily on building and utilising large-scale clusters.

The module will cover: distributed systems architecture, replication and fault tolerance, storage, coordination, scheduling algorithms, cluster computing, cloud computing, virtualisation, programming models (e.g., MapReduce), stream processing, decentralised systems (e.g., Chord), incentive-based systems (e.g., BitTorrent), and social computing (e.g., crowd sourcing techniques). This module will draw from the latest research in both academia and industry.

Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci	
Pre-requisite(s):	CS5001	
Learning and teaching methods and delivery:	**Weekly contact**: 3 hours of lectures (x 11 weeks), 1-hour seminar (x 4 weeks), 1-hour practical class (x 3 weeks)	
	Scheduled learning: 40 hours	**Guided independent study:** 110 hours
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%	
	As used by St Andrews: 2-hour Written Examination - 60%, Coursework = 40%	
Re-Assessment pattern:	2-hour Written Examination = 60%, Existing Coursework = 40%	
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk	

CS5199 Individual Masters Project

SCOTCAT Credits:	60	SCQF Level 11	**Semester:**	1 & 2 (taught twice)
Academic year:	2016/7 & 2017/8			
Planned timetable:	Full-time for one semester.			

This module allows students to undertake a major software engineering or research project, under the guidance of an individual supervisor. The project builds on experience gained in CS4099, although the topic must differ significantly from the 4000-level project.

Programme module type:	Compulsory for MSci Honours Computer Science	
Pre-requisite(s):	CS4099, Entry to MSci Honours Computer Science	
Learning and teaching methods and delivery:	**Weekly contact**: Individual supervision.	
	Scheduled learning: 45 hours	**Guided independent study:** 555 hours
Assessment pattern:	**As defined by QAA:** Written Examinations = 0%, Practical Examinations = 0%, Coursework = 100%	
	As used by St Andrews: Coursework = 100%	
Re-Assessment pattern:	No Re-Assessment available	
Module Co-ordinator:	hons-coord-cs@st-andrews.ac.uk	

ID5059 Knowledge Discovery and Datamining

SCOTCAT Credits:	15	SCQF Level 11	**Semester:**	2
Planned timetable:	11.00 am Mon (odd weeks), Wed and Fri			
Contemporary data collection can be automated and on a massive scale e.g. credit card transaction databases. Large databases potentially carry a wealth of important information that could inform business strategy, identify criminal activities, characterise network faults etc. These large scale problems may preclude the standard carefully constructed statistical models, necessitating highly automated approaches. This module covers many of the methods found under the banner of "Datamining", building from a theoretical perspective but ultimately teaching practical application. Topics covered include: historical/philosophical perspectives, model selection algorithms and optimality measures, tree methods, bagging and boosting, neural nets, and classification in general. Practical applications build sought-after skills in programming (typically R, SAS or python).				
Programme module type:	Optional for Computer Science BSc, Joint Computer Science degrees, Computer Science MSci			
Anti-requisite(s):	MT5759			
Learning and teaching methods and delivery:	**Weekly contact**: Lectures, seminars, tutorials and practical classes.			
	Scheduled learning: 35 hours		**Guided independent study:** 115 hours	
Assessment pattern:	**As defined by QAA:** Written Examinations = 60%, Practical Examinations = 0%, Coursework = 40%			
	As used by St Andrews: 2-hour Written Examination = 60%, Coursework = 40%			
Re-Assessment:	2-hour Written Examination = 60%, Existing Coursework = 40%			
Module Co-ordinator:	masters-coord-cs@st-andrews.ac.uk			