



**M.Sc. in Computer Science –
Artificial Intelligence
(Online)**

STUDENT HANDBOOK 2020 | 2021

NUI Galway School of Computer Science requires all students to have exclusive use of a laptop for use in lectures and labs, for home use of online materials and for participation in online sessions.

The minimum and recommend spec are detailed at <http://www.nuigalway.ie/science-engineering/school-of-computer-science/currentstudents/laptops/>.

We also operate a laptop loan scheme for students who cannot afford a suitable laptop (see same address).

Please note: This handbook is for information only and is correct at time of compilation. However, processes and procedures may change throughout the academic year. Please contact the relevant websites and Administrative Offices for up to date information.

1.1 M.Sc in Computer Science – Artificial Intelligence - Online

The M.Sc. in Computer Science - Artificial Intelligence - Online aims to deliver a cutting-edge programme in Artificial Intelligence to students working in industry in Ireland. It is funded by Technology Ireland ICT Skillnet. Dublin City University is a partner institution. It is a full MSc in Artificial Intelligence, not a conversion programme. It is aimed at students with strong undergraduate qualifications in relevant areas such as computer science, and/or extensive relevant industry experience.

All modules are delivered fully online. Delivery will be via video and readings through Blackboard, the online learning system. So, there is no weekly timetable. If you miss a week through illness or work commitments, normally you will be able to just catch up in your own time. (But if your study is seriously affected by circumstances out of your control, potentially affecting your grades, you may be eligible to apply for an assignment extension or exam deferral - see later in this document and policy online <https://www.nuigalway.ie/academic-skills/assignmentsexams/manageassignments/>). Students are required to attend the University only for normal exam periods at the end of Semester 1 (January 2021) and Semester 2 (April-May 2021). Exams are on-campus at the end of each semester. The NUI Galway calendar is linked below.

Some modules will hold occasional optional live online lectures. The times for these will be arranged and communicated by individual lecturers. We will also hold an online meetup during Orientation.

Workload

Students take 3 modules every semester (2 semesters per year) and a capstone project and thesis in year 2. Each module is worth 5 ECTS (credits) and a 5 ECTS module is estimated to take an average of 100 hours of work, including engaging with lectures, online discussions, reading, carrying out assignments, study time, and the final exam. Since the term is 12 weeks plus a reading week and exam time, this equates to approximately 3 modules x 100 hours / 14 weeks = 21 hours per week.

Assessment

Most modules use a mix of Continuous Assessment and Exams. The average mix is probably 40% CA and 60% Exams. Some CA items use group work.

Project

The Capstone project is worth 33% of the degree. It is a large independent project in the area of AI. It is research/scientific project, not just software development. The main outcome is a substantial thesis document. Students may choose their own topics (subject to faculty approval). Faculty will also offer several topics. An ideal topic is one which is of academic interest as well as being of value to your employer. During Year 1 Semester 2, we will discuss the procedures in detail and kick off the process of choosing topics and allocating students to supervisors.

Programming

We will use Python as the main programming language in the MSc. This reflects its wide use in machine learning and artificial intelligence, its suitability for general-purpose programming, and its wide use as a teaching language. We will also use R, especially for statistics. We will teach these languages from scratch in the module Programming and Tools

for Artificial Intelligence, but we will teach them very quickly, assuming that students have already studied programming and use programming as part of their current employment. One module will also use Java, that is Tools & Techniques for Large Scale DA. This module will not teach Java from scratch, but will assume students know the basics. Students who have not studied or used Java are encouraged to spend some time in advance to pick up basic Java.

Preparing for the MSc

All students admitted to the programme have excellent, suitable backgrounds, and so preparation is not required. Students who wish to brush up on topics or read about module content in advance may wish to consider some of the following resources:

- **General computer use:** understanding the filesystem, filename suffixes, using a command-line interface, installing software.
- **Programming:** A Whirlwind Tour of Python, Jake Vanderplas <https://jakevdp.github.io/WhirlwindTourOfPython/> (most of this book will be assigned as readings in the Programming and Tools for AI module)
- **Discrete Mathematics:** <https://cse.buffalo.edu/~rapaport/191/S09/whatisdiscmath.html> and <https://www.youtube.com/watch?v=tyDKR4FG3Yw&list=PLDDGPdw7e6Ag1EIznZ-m-qXu4XX3A0cIz>
- **Statistics:** Coursera Basic Statistics <https://www.coursera.org/learn/basic-statistics>
- **Calculus:** Khan Academy Calculus <https://www.khanacademy.org/math/multivariable-calculus>
- **Natural Language Processing:** the main textbook is Daniel Jurafsky, James H. Martin "Speech and Language Processing - An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Pearson, Prentice Hall, ISBN-10: 0131873210. Third Edition
draft: <https://web.stanford.edu/~jurafsky/slp3/ed3book.pdf>

Career Opportunities

Graduates will be excellently qualified to advance their careers in the area of Artificial Intelligence; such careers may include higher-level and R&D opportunities in industry, PhD-level research, or the establishment of new ventures that provide leading-edge AI solutions and products.

Academic Skills Resources

The following resources are recommended especially for students who are returning to study after a long break:

- <https://www.nuigalway.ie/academic-skills/>

ID cards and student services

Students of the MScAI Online are normal students of the University. They hold student ID cards, can use the library, can use all normal student services such as student parking (see elsewhere in this document), the Students' Union, student clubs and societies, etc. Students can collect their ID cards from the Reghelp Desks, first floor, Áras Uí Chathail from the start of term: <https://www.nuigalway.ie/registration/quick-links/id-cards/>

Faculty

The programme is delivered by the NUI Galway School of Computer Science (which incorporates the NUI Galway Data Science Institute), in collaboration with other Schools in NUI Galway (Philosophy, and Mathematics, Statistics, and Applied Mathematics), and Dublin City University. The School of Computer Science is part of the NUI Galway College of Science and Engineering. You may continue to see some references in old documents/websites to the IT Discipline which was part of the College of Engineering and Informatics.

The NUI Galway Computer Science faculty are listed at <http://www.it.nuigalway.ie/people/> Email addresses, phone numbers, and room numbers are provided. Faculty members' research interests are also listed.

Module Registration

After registering as an NUI Galway student, a student can register for modules. For the first semester, students of the MScAI Online take three core modules, with no choices, as shown below. Therefore, please register for these to gain access to Blackboard.

Programme Curriculum

This is a 2-year 90-ECTS course with three main elements:

- Core foundational modules (35 ECTS)
- Optional advanced modules (25 ECTS), and
- A substantial capstone project (30 ECTS).

In Year 1, all modules are core. In Year 2, a choice among optional modules may be available. The modules offered are as follows, subject to availability.

NUI Galway MSC in Computer Science - Artificial Intelligence (Online)					MAO	Year 1			Year 2		
Code	Module Title	ECTS	Year	Sem.	Lecturer(s)	S1 : 15 ECTS	S2 : 15 ECTS	Summer	S1 : 15 ECTS	S2 : 15 or 17.5 ECTS	Summer
CT5143	Machine Learning - Online	5	1	1	M Madden & P Mannion	ML					
CT5146	Introduction to Natural Language Processing - Online	5	1	1	P Buitelaar & J McCrae	NLP					
CT5148	Programming and Tools for AI - Online	5	1	1	J McDermott	Prog					
CT5149	Research Skills in Artificial Intelligence - Online	5	1	2	D O'Sullivan		Research				
CT5136	Data Visualisation - Online	5	1	2	C Hayes		Data Viz				
CT5150	Tools and Techniques for Large Scale Data Analytics - Online (-> DCU)	5	1	2	M Nickles & E Curry		LSDA				
CT5152	Artificial Intelligence and Ethics - Online	5	2	1	H Schmidt-Felzmann				Ethics		
CT5153	Information Retrieval - Online	5	2	1	C O'Riordan				IR		
STxxxx	Statistics for AI (provisional title)	5	2	1	J Newell				Statistics		
CT5145	Deep Learning - Online	5	2	2	M Madden & J McDermott					Deep Learning	
CT5130	Agents, Multi-Agent Systems and Reinforcement Learning - Online (-> DCU)	5	2	2	E Howley & E Barrett					RL/MAS	
CT5147	Knowledge Representation and Statistical Relational Learning - Online (-> DCU)	5	2	2	M Nickles					KR/SRL	
DCU_CA 681	DCU -> Machine Translation - Online	7.5	2	2	Q Liu (DCU)					Trans	
DCU_CT 5158	DCU -> Mechanics of Search - Online	7.5	2	2	C Gurrin (DCU)					Search	
CT5131	Capstone Project and Thesis in Artificial Intelligence - Online	30	1,2	1,2,3	J McDermott			Project			
See http://www.it.nuigalway.ie/people/ for lecturer details											
DCU ->	Delivered by DCU					core					
-> DCU	Offered to DCU					optional					

For information on the syllabus, please take a look at:
http://www.nuigalway.ie/courses/taught-postgraduate-courses/online-artificial-intelligence.html#course_outline . If you scroll down you can click "+" for each module to see more details.

Programme Director

Programme	Programme Director	Room	E:mail
M.Sc in Computer Science – Artificial Intelligence - Online	Dr James McDermott	441	james.mcdermott@nuigalway.ie

2.1 Maps

NUI Galway Campus map can be located on the University's website at:

http://www.ptba.nuigalway.ie/images/campus_map_.pdf

<http://www.nuigalway.ie/media/internationalstudents/files/Campus-Map-Sept-2014.pdf>

2.2 Examinations

The Examinations Office posts all results to the home address of each candidate. It is the responsibility of students to inform the **Admissions Office** of any change of address.

Results

Results will **NOT** be given on the telephone to candidates, or to anyone acting on their behalf.

Examination Timetables

Examination timetables may be viewed on the NUI, Galway web page at the following address: <http://www.nuigalway.ie/exams/timetable-advice/examtimetable/>. Personalised timetables will be available on the WEB on a date to be advised by the Exams Office.

Timetables will NOT be posted to students.

Please be advised:

- Check the timetable OFTEN as changes may occur
- Revisions to timetable will be published on the Examinations Office WEB page only
- Revisions to timetable will not be posted to individuals

Repeat, Appeals and Re-checks

Appeals and rechecks should be addressed to the Examinations Office. In the case of Appeals, candidates must first consult the Head of the College of Engineering & Informatics for advice. A fee must be lodged with both the Appeal and Recheck Forms. Appeals from summer examinations must be lodged within four weeks after the issue of results (and up to three weeks after the issue of results in autumn where). Rechecks must be lodged up to three weeks after the issue of summer examination results. Fees are refunded if the outcome is positive.

Exam Board Sitings

The examinations board will sit in June and October where relevant examination, project and theses grades will be processed by the College of Engineering & Informatics.

Deferral of Exams

A guide for exam deferrals is available at <http://www.nuigalway.ie/exams/timetable-advice/deferrals/>. This guide is to assist students with the process and provides a link to the application form and guidelines.

2.3 Student Services

Coming to University is a major milestone in your life and a point of changeover in your life. You are facing into some challenges and many opportunities. You will encounter the enjoyment and challenges of independence and decision-making and responsibility for your own well-being and lifestyle.

Student Services is a team that are core to the personal and academic development of students. Student Services is under the management of the Vice President for the Student Experience. Student Services is committed to enhancing the individual student experience by providing an excellent service which supports the holistic development of the person, thereby enabling each student to achieve their full academic potential. Through valuing, recognising and supporting each staff member and by forging strong alliances within the University Community, Student Services will assist NUI Galway to become a truly Student Centred University.

Student Services provides support as follows:

- Personal Support: Accommodation, Chaplaincy, Counselling, Disability Support, Mature Students office, Health Unit, Student Connect Mentoring Programme.
- Career and Professional Support; Job Search; Postgraduate Study & Student Abroad, Career and occupation information, Work Experience (PEP and GEP).
- Social and Recreational Opportunities; Sport Facilities, 40 Sports Clubs, 77 Societies and Sports Centre.

Detailed information on all the Student Services offered by NUI Galway may be found at <http://www.nuigalway.ie/student-life/student-support/>

Student Services Staff

Mr. John Hannon
Director
Aras Uí Cathail
Tel: 091-493586 ext. 3586
E-mail: john.hannon@nuigalway.ie

Ms. Teresa Kelly
Administrative Assistant
Aras Uí Cathail
Tel. 091-492364 ext. 2364
E-mail: Teresa.Kelly@nuigalway.ie

Ms. Una McDermott
Administrative Assistant
Aras Uí Cathail
Tel: 091-495282 ext. 5282
E-mail: Una.McDermott@nuigalway.ie

Ms. Angela Walsh
Administrative Assistant
Aras Uí Cathail
Tel: 091-493540 ext. 2364
E-mail: Angela.Walsh@nuigalway.ie

2.4 Computer Science Account and Swipe Card Access to Labs

The School of Computer Science has a number of undergraduate and postgraduate rooms which are for the use of our own students. Within these rooms are computers and printers. All students who are taking a module/course with the School of CS are entitled to an account to access the open access labs in the IT Building (Note: IT 106 is available to all NUIG students using main NUIG account). Depending on their course they may also have swipe card access to further project labs in the IT Building.

Accounts are setup automatically after a student registers for one of our modules/courses, and students will receive an email to their NUIG email to indicate the account is ready for use. Students must then log on to a URL to retrieve their password: <http://www2.it.nuigalway.ie/accounts/>. This will give the password, weekly print quota and list any swipe card access to rooms. Students who have issues with their Computer Science computer account, a PC or swipe access in the IT Building should log a call to Computer Science Technical officers: support@it.nuigalway.ie.

Useful link for further related info: <http://www.cs.nuigalway.ie/currentstudents/>. Students who have issues with their main NUIG account, Wifi, Blackboard, personal laptops or any PC/printer on the rest of campus should refer to the NUIG helpdesk: <http://www.nuigalway.ie/information-solutions-services/services-for-students/>

2.5 DISC - Computer Programming Drop-In Support Centre

Computer DISC is a Computer Programming Drop-In Support Centre for all NUI Galway students who are taking any programming/software development courses. The DISC is a free service that supports all students with their self-directed learning in computing topics at all years and levels in NUI Galway. The centre is located in Room 205 on 1st floor of the Information Technology (IT) Building.

What services does Computer DISC provide to students?

- Facilities for students to sit and work on programming problems
- One-to-one advice and support for students, and focused small group tutorials
- Books, courseware, web links, and other learning resources for programming students
- A website with information and an email service for all queries
- Advice for students who wish to learn new programming languages autonomously
- Assistance with new technologies for project work such as Final Year Projects

2.6 Student Counselling

The counselling service is part of a network of support services offered by NUI, Galway. It provides professional counselling, which is **free** and **confidential** to all students of NUI, Galway. Life as a student is exciting and challenging, an achievement usually gained after much hard work and preparation. It can also be stressful at times. You may find you are experiencing personal difficulties which are affecting your ability to study and to take full advantage of the opportunities available to you at NUI, Galway. This is where we can help. We are a team of qualified and experienced counsellors, psychologists and psychotherapists. The service operates within the Code of Ethics and Practice agreed by the Irish Association of University and College Counsellors (IAUCC). The services provided include:

- Pre-counselling assessment
- Individual counselling and psychotherapy
- Group work
- Information and referral
- A consultation service for those who may have concerns about a student – such as tutors, university staff, friends or parents

A drop in service is open every weekday in term time from 2.00pm to 4.00pm. Further information is available <http://www.nuigalway.ie/counsellors/about-us/>

Counselling Staff

Ms. Geraldine Connolly, Head of Counselling

Direct Tel: 091 – 495202, Ext. 5202

E-mail: geraldine.connolly@nuigalway.ie

Ms. Emer Casey, Counsellor

Direct Tel. 091 – 495633, Ext. 5633

E-mail: emer.casey@nuigalway.ie

Contact Address:

Counselling Services No. 5 Distillery Road NUI, Galway

Direct Tel: 091 492484 ext. 2484

E-mail: counselling@nuigalway.ie

2.7 Blackboard

Blackboard is the Virtual Learning Environment (VLE) in use at NUI Galway. Blackboard is a web based application that gives students access to all their courses at NUI Galway. Blackboard allows students to download lecture notes, reading lists, assessment information and other course-related material. Students have access to their online Blackboard courses once they have registered with NUI Galway. When a student registers for a course or module with the NUI Galway Student Records System, they are automatically enrolled in the corresponding course on Blackboard. These changes are recognised by Blackboard within 24 hours.

If students require additional assistance with their login, they should contact the Service Desk within Information Solutions and Services (ISS). ISS can assist students with queries they may have relating to Blackboard including logging in to Blackboard or queries relating to their password or e-mail account. If students are unable to see courses when they log into Blackboard, they will need to check their registration statement to ensure they are correctly registered.

Students who are not registered, will need to contact Admissions or the Student Contact Centre on the ground floor of Áras Uí Chathail to process their registration details prior to gaining access to Blackboard.

2.8 Plagiarism

Plagiarism refers to copying another author's work without due reference or acknowledgement of the author. Plagiarism is not acceptable. It is essential that the candidate acknowledge other people's work, when used by the student. The submitted work must be prepared by the candidate alone, and must be the result of the candidate's own effort, skills and knowledge. It is unacceptable for candidates to knowingly permit others to copy their work. NUI, Galway has a strict code of practice for dealing with plagiarism, please visit the following site for more details – <http://www.nuigalway.ie/plagiarism/>

2.9 Information Solutions and Services (ISS)

ISS aim to provide students with access to the ICT facilities which they need to succeed in their studies at NUI Galway. These facilities include high speed Internet access, an NUI Galway email account, and access to the resources of the James Hardiman Library and the Blackboard virtual learning environment. These services are accessible from the on-campus PC suites and from suitably equipped laptops using the on-campus wireless network. A Campus Account (CASS) provides students access using a single User ID and Password to all computing services, other than E-mail. Students should refer to their Registration Guide for their temporary activation password. To activate your Campus Account, student need to go one to <https://cass.nuigalway.ie/> and login using their current student ID number and the activation password.

ISS Service Desk (Service Desk is located in the foyer of the James Hardiman Library).
E-mail address: servicedesk@nuigalway.ie

2.10 Career Development Centre

The Career Development Centre is focused on facilitating and empowering students of NUI, Galway to manage their own career development and empowering students to make successful transitions towards fulfilling careers. Careers send out weekly emails to students with upcoming events during term to all students.

Details of the services provided to students by the Career Development Centre include:

- finding out options with your degree
- getting information on careers
- finding out about further study
- finding out or applying for a job
- develop skills that employers want
- Internships and Work Experience Fair
- Professional Associations Expo.

The Careers Development Centre host workshops to help students with applications and job search. One-off sessions are also offered to students and are bookable through Careers Connect and include:

- CV workshops - held monthly during semester.
- Interview workshop - held once a semester.
- LinkedIn workshop - typically 3 per semester.
- Personal Statement workshop - held once a semester

Further information on the range of services provided by the Careers Development Centre can be found at: <http://www.nuigalway.ie/career-development-centre/>

2.11 Out of Hours Working

Out of hours work refers to all University operations conducted outside normal hours. There are two relevant time-scales:

- **5.30pm – 11pm (week-days) and 8am – 11pm (weekends)**

When University buildings are accessible and while not in full operation, there may still be many people on site.

- **11pm – 8am (week-days and weekends)**

When University buildings are locked by Security and therefore only accessible to personnel with keys.

All such out of hours working are high risk because:

- Fewer staff and students are on-site to raise the alarm and/or give assistance in the event of an accident or incident
- Modified emergency measures may apply
- Personnel may be working alone

The listed below are the controls/arrangements to be used in reducing the risk of out of hours working:

- Out of hours working must be eliminated as much as possible. In particular high hazard work, or work/study by inexperienced persons, e.g. undergraduate students, **MUST** be restricted to normal University hours, when they can be appropriately supervised
- Hazardous work, e.g. laboratory operations, must be planned in advance to eliminate the hazardous procedures that need to be conducted out of hours*. Any work, which must be carried out outside normal working hours, must be conducted in pairs (buddy-system) or with a colleague within easy calling distance
- Persons working out of hours must receive written permission from the Head of department/section. This permission must be restricted to personnel who can justify the requirement to work out of hours
- A register of late night work is to be maintained by Security. This will be made up from the lists of those personnel authorized to work late, submitted by the Head of the department/section. Any personnel not listed and found in the department/section after 11pm will be requested to leave by Security. Where a later finishing time has been approved by a Head of department/section, this will be made known to Security and treated as the final finishing time
- Ensure necessary emergency equipment/measures are available and made known to persons working out of hours, e.g. which emergency escapes are available, accessible phones with outside lines for emergency phone contact
- *Operations/experiments – if left running without supervision, must be as safe as possible in advance, and should be identified by an Unattended Experiment Form. The Safety Health and Welfare at Work (Night work and Shift work) Regulations 2000 S.I 11 of 2000 must also be complied with, when and where applicable

2.12 Parking on Campus

Parking spaces in NUI, Galway fall into a number of categories:

- Staff Only
- Student Only
- Pay and Display (P&D) spaces
- "Reserved" spaces and loading bays

The parking permit payment system can be accessed via the Buildings Office website at <http://www.nuigalway.ie/buildings/parking.html>. Please note that you will be required to login, using your normal NUI Galway username/password authentication.

To purchase/renew your Student Parking Permit please log on to <https://permits.apcoa.ie/>.

If you park in a "Pay and Display" space, you must display a valid Pay & Display ticket and park only in spaces marked "Pay and Display". Should you have any queries, please consult our *Frequently Asked Questions* on <http://www.nuigalway.ie/buildings/faq.html>

A park and ride service operates from Dangan car park. Further information and timetable details are available from http://www.nuigalway.ie/buildings/documents/park_and_ride_timetable

Parking Office Location: Room 103A, Ground Floor Arts Millennium Building

Opening Hours: Monday to Friday, 0930 - 1200 and 1400 - 1600

Contacts:

Email: parking@nuigalway.ie

Tel. 353 91 495063 (ext. 5063)

2.13 Registration

Online registration opens on Tuesday 15th September for postgraduate taught students. Details of relevant dates can be found on: (<http://www.nuigalway.ie/registration/quick-links/registration-dates/>). Students will receive an email from registration before Online Registration opens inviting students to register online. Students should register as soon as possible for their programme to gain access to University services such as Student ID Card, Library, Blackboard, etc. Further registration details can be found on: http://www.nuigalway.ie/registration/reghelp_home.html/newstudentpostgrad/

2.14 Library

The Student ID card also acts as a Library card. Students must have a current card in order to gain entrance to the Library. Details on the services provided by the library are available at <http://library.nuigalway.ie/usingthelibrary/accessingthelibrary/> The Library and IT Service Desk is located on the ground floor of the library and provides advice and support to students on both Library and IT services (e.g., User ID/passwords, book loans, printing Wifi access).

2.15 Student Contact Centre

The Student Contact Centre (tel: (091) 495999) provides the following services and is located on the ground floor of Áras Uí Chathail, which is situated on the main campus:

- Registration, Exams and Admissions queries
- Prospectus pick up
- Replacement ID Cards
- Transcript Requests
- Validation and stamping of forms e.g. social welfare, medical card, drug payment,
- USIT visa (Student Travelcard forms are stamped by SU)
- Change of Name/ Change of Address requests
- Statements e.g. letters of attendance

Useful Contact Numbers (<http://www.nuigalway.ie/about-us/contact-us/>)

Student Information Desk	(091) 495999
ISS Help Desk	(091) 495777
Admissions Office	(091) 495999
Accommodation Office	(091) 492760
Disability Liaison Office	(091) 492813
Fees Office	(091) 492386
Health & Safety Office	(091) 492678
Campus Security / Emergency	(091) 493333
Student Counselling	(091) 492484
Student Health Unit	(091) 492604
Students Union Shop	(091) 492411
General Emergency	999
Local Garda Station	(091) 538 000
Hospital (UCHG)	(091) 580580
Samaritans	(091) 561222