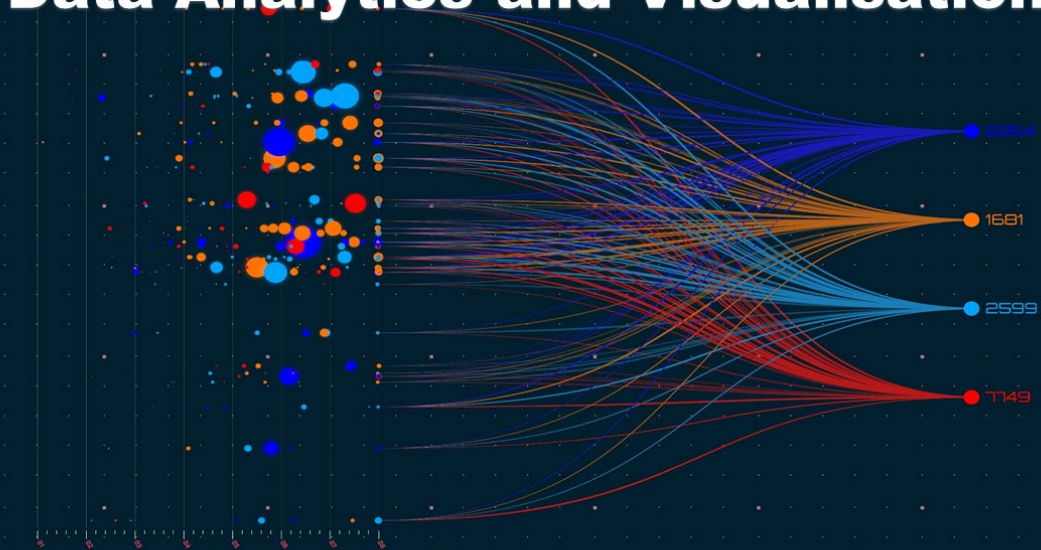




## HDip in Computer Science

# Data Analytics and Visualisation



[www.cs.nuigalway.ie](http://www.cs.nuigalway.ie)

[www.cs.nuigalway.ie](http://www.cs.nuigalway.ie)

# **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).

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**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.

## **Section 1: Programme Descriptions**

### **1.1 H.Dip (Data Analytics & Visualisation)**

This course is a conversion course to enable graduates to take up the increasing opportunities to work as data analysts, who are in demand across multiple sectors, including Financial, Government, Manufacturing, Food, Health and Media.

The course emphasises the development of strong theoretical and applied foundations, and builds on our existing strengths in Data Science and Analytics in the School of Computer Science and the Insight Institute, and our experience in running a successful Masters in Data Analytics.

The programme has a number of core elements:

- Immersion in fundamental database and software development techniques.
- A solid foundation in statistical and analysis methods.
- Expertise in data analysis, visualisation and business intelligence using leading edge tools and programming languages.
- Capstone project to deepen and demonstrate students' acquired skills.
- A significant placement/internship allowing participants to gain relevant experience and also provide Industry Partners with an opportunity to assess potential recruits.

On completion of the programme, graduates will be eligible to take our highly successful MSc in Data Analytics, providing a deeper and more specialised training in advanced Data Science, Machine Learning topics. Transition to this programme is contingent on spaces and achieving a 60% average in the Higher Diploma.

## Section 2: General Information

### 2.1 Academic Calendar 2020-2021

The Academic Calendar is available on:

[http://www.nuigalway.ie/academic\\_dates/academic\\_term\\_dates.html](http://www.nuigalway.ie/academic_dates/academic_term_dates.html)

<b>Academic Year 2020-2021</b>	
<b>Semester 1</b>	
Start of Teaching (UG years (excluding Year 1) and Postgraduate Taught programmes)	Monday 28th September 2020
End of Teaching all years	18 <sup>th</sup> December 2020
Semester 1 Exams	11 <sup>th</sup> – 22nd January 2021
<b>Semester 2</b>	
Teaching (All Years, UG & PGT)	Monday 8 <sup>th</sup> February 2021 – Friday 2 <sup>nd</sup> April 2021
<b>Easter</b>	<b>Good Friday 2nd April -Easter Monday 5th April 2021</b>
Field Trips	Tuesday 6th April – Friday 9th April 2021
Teaching (All Years, UG & PGT)	Monday 12th April – Friday 7 <sup>th</sup> May 2021
Semester 2 Exams	18 <sup>th</sup> May – 4 <sup>th</sup> June 2021
<b>Easter Holidays: Good Friday 2nd April to Easter Monday 5th April 2021</b>	
<b>Bank holidays: Monday 26th October 2020 / Wednesday 17th March 2021 / Monday 3rd May 2021 / Monday 7th June 2021 / Monday 2nd August 2021</b>	

## 2.2 Key Contact Details

### Programme Directors

Programme	Programme Director	Room	E:mail
H.Dip (Data Analytics & Visualisation)	Dr Owen Molloy		Owen.molloy@nuigalway.ie

### Administrative and Technical Staff

Administrative Staff		Room	E-mail
Ms. Mary Hardiman	Administrator	414	Mary.hardiman@nuigalway.ie
IT Technical Staff			
Mr Peter O’Kane	Chief Technical Officer	435	Peter.okane@nuigalway.ie
Mr John Hynes	Senior Technical Officer	420	John.hynes@nuigalway.ie
Mr Joe O’Connell	Senior Technical Officer	434	Joe.oconnell@nuigalway.ie

**The School of Computer Science is located in the IT Building, Floor 3.**

### **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

## **2.3 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.ptba.nuigalway.ie/images/campus_map_.pdf)

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



## 2.4 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.

## 2.5 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](mailto:john.hannon@nuigalway.ie)

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

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

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

## **2.6 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](mailto: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/>. 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/>

## **2.7 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

## 2.8 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](mailto:geraldine.connolly@nuigalway.ie)

Ms. Emer Casey, Counsellor

Direct Tel. 091 – 495633, Ext. 5633, E-mail: [emer.casey@nuigalway.ie](mailto:emer.casey@nuigalway.ie)

**Contact Address:** Counselling Services No. 5 Distillery Road NUIG.

Tel: 091 492484 ext. 2484.

E-mail: [counselling@nuigalway.ie](mailto:counselling@nuigalway.ie)

## 2.9 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.

## **2.10 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 refer to this link for more details – <http://www.nuigalway.ie/plagiarism/>

## **2.11 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](mailto:servicedesk@nuigalway.ie)

**Direct Phone:** 091 495777. **Extension:** 5777

## **2.12 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/>

### **Career Development Centre**

Location: Arts/Science Building (1<sup>st</sup> Floor)

Tel: +353 (0)91 493589

## 2.13 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

## 2.14 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 details are available from [http://www.nuigalway.ie/buildings/documents/park\\_and\\_ride\\_timetable](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

**E-mail:** [parking@nuigalway.ie](mailto:parking@nuigalway.ie)

**Tel. 353 91 495063 (ext. 5063)**

## 2.15 Registration

Online registration opens on Tuesday 15<sup>th</sup> 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/](http://www.nuigalway.ie/registration/reghelp_home.html/newstudentpostgrad/)

## 2.16 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).



## 2.17 Module Descriptions

### *Semester I Modules*

Module Name	Module Description	Credits
<b>CT5160 Industrial Data Analytics Project (SI &amp; II)</b>	<p>Applied Data Analytics and Visualisation project, in collaboration with industry and placement partner.</p> <p>Lecturer: Dr. Owen Molloy  <a href="mailto:owen.molloy@nuigalway.ie">owen.molloy@nuigalway.ie</a></p>	Credits: 15
<b>CT5161 Introduction to Programming in Python</b>	<p>Introduction to Programming in Python (Algorithms and Information Processing, Control Structures, Modular Programming, Object-Oriented Programming, File Input/Output, Data Structures, Graphics and Graphical User Interfaces)</p> <p>Lecturer: Dr. Patrick Mannion  <a href="mailto:patrick.mannion@nuigalway.ie">patrick.mannion@nuigalway.ie</a></p>	Credits: 5
<b>CT511 Databases</b>	<p>This module will provide the student with the information and technical know-how to establish, manage and optimally use databases. This will be essential information for those interested in Clinical Research administration.</p> <p>Lecturer: Dr. Attracta Brennan  <a href="mailto:attracta.brennan@nuigalway.ie">attracta.brennan@nuigalway.ie</a></p>	Credits: 5
<b>CT870 Internet Programming</b>	<p>Design and implement web pages. Connect a website to a database. Create dynamic web content.</p> <p>Lecturer: Dr. Enda Barrett  <a href="mailto:enda.barrett@nuigalway.ie">enda.barrett@nuigalway.ie</a></p>	Credits: 5
<b>CT865 Human Computer Interaction</b>	<p>This module is an introductory Human Computer Interaction course. It is concerned with the design of effective interactions between people and computers. It is intended to give insight and experience in key issues of HCI design. Students will complete the course with a greater understanding of the criticality of design to the successful development of computer systems, and armed with the knowledge of the principles and methods required to create excellent interfaces to any technology.</p> <p>Lecturer: Ms. Karen Young  <a href="mailto:karen.young@nuigalway.ie">karen.young@nuigalway.ie</a></p>	Credits: 5

<b>ST2001 Statistics for Data Science 1</b>	<p>The course provides an introduction to probabilistic and statistical methods needed to make reasonable and useful conclusions from data. Topics include probabilistic reasoning, data generation mechanisms, modern techniques for data visualisation, inferential reasoning and prediction using real data and the principles of reproducible research. The course will rely heavily on R (a free open source language) and will include examples of datasets collected in a variety of domains.</p> <p>Lecturer: Dr. Davood Roshan Sangachin <a href="mailto:davood.roshansangachin@nuigalway.ie">davood.roshansangachin@nuigalway.ie</a></p>	Credits: 5
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*Semester II Modules*

<b>Module Name</b>	<b>Module Description</b>	<b>Credits</b>
<b>CT5163 Applied Data Science with R</b>	Using the R programming language and tidyverse libraries for exploratory data analysis, data visualisation, data modelling and data transformation.  Lecturer: Dr. John McCrae <a href="mailto:john.mccrae@nuigalway.ie">john.mccrae@nuigalway.ie</a>	Credits: 5
<b>CT5162 Business Intelligence</b>	Database and Data Warehouse Technologies and Architectures, Data Integration and ETL (Extract, Transform, Load) concepts and tools, Data Modelling, NoSQL, OLAP, KPIs (Key Performance Indicators), Dashboarding, Querying and Reporting, Vendor Tools  Lecturer: Dr. Owen Molloy <a href="mailto:owen.molloy@nuigalway.ie">owen.molloy@nuigalway.ie</a>	Credits: 5
<b>CT5160 Industrial Data Analytics Project (SI &amp; II)</b>	Applied Data Analytics and Visualisation project, in collaboration with industry and placement partner.  Lecturer: Dr. Owen Molloy <a href="mailto:owen.molloy@nuigalway.ie">owen.molloy@nuigalway.ie</a>	Credits: 15
<b>ST2002 Statistics for Data Science 2</b>	This course will provide an introduction to commonly used techniques in statistics when analysing data from experiments and observational studies. Topics include classical and modern methods in interval estimation, regression models for prediction problems, modern approaches for visualising multivariate data and the principles of reproducible research.  Lecturer: Dr. Davood Roshan Sangachin <a href="mailto:davood.roshansangachin@nuigalway.ie">davood.roshansangachin@nuigalway.ie</a>	Credits: 5
<b>CT5100 Data Visualisation</b>	This module will teach the fundamentals of data visualization. It will cover basic design principles and the principles underlying human perception, color theory and narrative. It will focus on the use of open standards for the presentation of data on the Web such as HTML, CSS, SVG, JavaScript through the use of libraries such as D3.js, jQuery.js and Dimple.js.  Lecturer: Dr. Conor Hayes <a href="mailto:conor.hayes@nuigalway.ie">conor.hayes@nuigalway.ie</a>	Credits: 5