Swansea University Medical School

Health Informatics & Health Data Science Courses

Swansea University
Prifysgol Abertawe

Postgraduate & Continuing Professional Development

Contents

Swansea University
Prifysgol Abertawe

A world-class University

Making Waves Since 1920

Swansea University is a research-led university that has been making waves since 1920. Swansea University offers the right balance of innovative teaching and research, matched with an enviable quality of life.

Swansea benefits from being one of the closest universities to the beach, while being surrounded by beautiful parkland. Only ten minutes from the city centre, students can enjoy the local attractions, restaurants and nightlife.

The University offers hundreds of undergraduate and postgraduate degree schemes, as well as an award-winning student experience while offering plenty of opportunities to study or work abroad. With an outstanding careers service and strong links with industry, the University can help students find employment opportunities while studying.

As well as the Singleton Park campus, Swansea University has a newly opened Bay Campus which is situated in an outstanding location on the eastern approach into Swansea, with direct access onto the beach and its own seafront promenade. The campus provides academic teaching space, student accommodation and research space, the latter being part of a series of agreements with international and national companies. The campus development work will continue up until 2020.

#makingwaves

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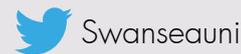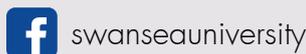
UK TOP 30
↑ 26th 52nd

REF2014
Research Excellence Framework

"Among the research-intensive institutions, Swansea University made the biggest leap, from joint 52nd to joint 26th" (Times Higher)

TOP 20 for graduate employment
Times and Sunday Times Good University Guide League Table 2015

TOP 20 for student satisfaction
NSS 2014

TOP 15 for student experience
Lloyds Bank Quality of Life Survey 2014

1

Medical School

The Swansea University Medical School is one of the UK's leading centres for medical research. The Medical School is committed to innovative health and life sciences research and is able to offer outstanding undergraduate and postgraduate opportunities in medical training on its fast track graduate-entry programme and in scientific training, encompassing experimental science and health services.

The strength of the School's research was emphasised by the results of the most recent Research Excellence Framework (REF) in 2014. The achievements include:

- 100% 4 star for research environment, ranking it joint 1st in the UK
- 100% 3 and 4 star for impact case studies
- 92% 3 and 4 star for research outputs
- 95% 3 and 4 star for research overall

The REF results place Swansea University Medical School 2nd in the UK ranking for Allied Health Professions, Dentistry, Nursing and Pharmacy. Swansea University has climbed from 52nd place in the UK in 2008 to 26th in 2014 - this is the largest climb up the rankings of any research-intensive University in the UK.

The School adopts an interdisciplinary approach to translational medicine from basic laboratory science to health care delivery, underpinned by health informatics, mathematical modelling, world-class supercomputing and mass spectrometry. Postgraduate students will have access to outstanding laboratory and clinical research facilities in the £100 million Institute of Life Science.

#1 UK
World-leading in research environment

#2 UK
REF2014
Research Excellence Framework

UK TOP 10
A Top 10 Medical School
The Independent Complete University Guide & The Times and Sunday Times Good University Guide 2017

Data Science Building

A world-class and state-of-the-art research facility to enhance research collaboration, innovation, and professional training and development in population data science, and home to Health Informatics and Health Data Science students.

The newly completed £8 million Data Science building, an addition to the Medical School, based at Swansea University's Singleton Park Campus, was made possible by funding from the Medical Research Council (MRC), the Economic and Social Research Council (ESRC), and the Welsh Government.

The six storey purpose-design building, with a total area of 2900m², provides a state-of-the-art research environment for interdisciplinary innovation, allowing researchers and staff from a range of organisations to work together on cutting-edge data science and informatics while protecting privacy. The work within the building focuses strongly on public engagement to ensure that the benefits of this type of research are acceptable and visible.

With both physical and information (data) security at the forefront of its design, the Data Science building incorporates a highly secure server room which is used for the operation and management of critical information processing and storage infrastructure. This is complemented with a Secure Access Laboratory ('Safe Haven') which facilitates the safe, secure and monitored access to de-identified linked data by approved and accredited researchers. These facilities, connected by secure state of the art communications technology, allows the building to store information which is classified as 'official/official sensitive'.

The building brought two exciting Centres of Excellence together under one roof - the £9.3 million Farr Institute and the £8 million Administrative Data Research Centre Wales, enabling researchers to work together to unleash the potential of large scale data to conduct new research through its powerful, robust data linkage and analysis facilities, cutting edge technology and expert staff.

There are currently over 100 staff occupying the building. They include teams who are working on projects involving the SAIL Databank, commercial and outreach projects, the Health Informatics and Health Data Science teaching programmes, the Research Institute for Applied Social Sciences (RIASS) and ESRC Wales Doctoral Training Centre, as well as members of staff from the NHS and Welsh Government.

The collaboration will drive the production of novel informatics solutions to underpin the delivery of a better and more targeted service and treatments for NHS patients and wider public benefits.

Health Informatics

Swansea University Medical School has an outstanding track record and world renowned reputation for excellence in health informatics through an extensive tradition of health informatics teaching and plays a vital role in the research infrastructure for Wales. It has active collaborations throughout the UK, with links across academia, industry and the NHS, as well as many international partnerships.

The Health Informatics and Health Data Science teaching programmes are based within the award winning Centre for Excellence for eHealth Research (The Farr Institute) as awarded by the Medical Research Council (MRC), and also the Centre for Excellence for New Innovative Administrative Data Research (Administrative Data Research Centre Wales) awarded by the Economic Social and Research Council (ESRC).

Study with us

www.mschealthinformatics.swansea.ac.uk

MScHealthInformatics

MSc_HI

MSc_HealthInformatics_SU

Be at the for

The Association of the British Pharmaceutical Industry (ABPI) 2015 report: "Bridging The Skills Gap In The Biopharmaceutical Industry", has identified the skills gap in health informatics

60k

You're HIRED

people are estimated to be employed as health informaticians in the UK

NHS

The NHS Wales Informatics Service alone needs to recruit around 100 informaticians a year

refront of the fastest growing specialty in healthcare

Health Informatics

MSc/PGDip/PGCert
Full time or part time

Government policies, professional bodies and European strategies have all made explicit reference to the need for healthcare staff with health informatics education and training to keep in line with new developments and the changing nature of new technology.

This programme is designed for healthcare professionals and those who want to increase their knowledge and skills in health informatics, and graduates preparing for a career in health informatics.

This programme is accredited by the UK Council for Health Informatics Professions (UKCHIP).

MODULES TYPICALLY INCLUDE

- Health Informatics in Context
- Coding and Communication Systems
- Using Secondary Data
- Information Systems and Technologies
- Knowledge Management
- Undertaking Health Informatics Research or Leadership in Project Management
- Dissertation

ENTRY REQUIREMENTS

Candidates with two years of relevant employment are welcomed, as well as graduates of a relevant discipline with an Honours classification of 2.2 or above, or an equivalent recognised qualification.

Applications from non-graduates with domain experience are welcome.

Our fellow alumni testimonials

More than 90% of our graduates from this course are currently employed by major hospitals, governments or public sector, research institutions and multi-national companies in the UK and overseas.

"Not only has the MSc in Health Informatics given me a clearer understanding of areas within Health Informatics that I may not have come across in my Project Management role, but it has also opened up many opportunities for me. I have had the confidence to apply for posts at a much higher level than I would have applied for before, so much confidence in fact that I am now Head of Patient and Clinical Systems for Virgin Care.

The course is interesting and informative. I enjoyed both the lectures and completing the assignments. The tutors are approachable but extremely supportive and conscientious. I would highly recommend this course for anybody who wants to further their career in the field of informatics."

Emma Gale, United Kingdom
Head of Patient and Clinical Systems, Virgin Care

Graduated from the MSc in Health Informatics at Swansea University in 2014

"When I started my career, I was head of informatics in a large teaching hospital in Saudi Arabia where health informatics is still in its infancy. I therefore needed to enhance my knowledge of health informatics and help to establish new ways of utilising informatics in a clinical environment. I also wished to further my career prospects, and enhance my research capabilities. The MSc in Health Informatics came highly recommended, and I was also attracted to the fact that is uniquely linked to a professional registration in health informatics with UKCHIP, and as a non IT based programme it met my needs as a health professional.

I found the course to be well organised, with a balance of lectures from practical to theory, which has benefitted me enormously since graduating. I think the highlight was the support that I had from my lecturers and supervisors, especially during my dissertation period, when I gained a vast amount of knowledge about my chosen topic and the research process as a whole.

I would say that the course has helped shape my career path, leading to a direct promotion and salary increase. I use much of what I learned during my time in Swansea on a daily basis and have enthused about the course to many of my peers and colleagues."

Dr Hamza Al-Katranji, Saudi Arabia

Director, Healthcare Informatics, King Fahad Specialist Hospital Dammam

Graduated from the MSc in Health Informatics at Swansea University in 2012

"Currently, I work at the Royal Civil Service Commission (RCSC) as the Officiating Chief Information and Media Officer after completion of a successful career of 9 years in the Ministry of Health, Royal Government of Bhutan.

My role as Head of ICT Unit in the Ministry of Health was ICT deployment in Bhutan's Health sector focusing on transforming of healthcare delivery through use of Information Communication Technologies (ICTs) such as Telemedicine, Hospital Information System (Electronic Patient Record) and mHealth solutions.

The MSc in Health Informatics has helped me understand the whole process of healthcare delivery transformation through use of ICT in an international context and best practices. The course also strengthened my research abilities and critical thinking which guided me in making informed and evidence-based decisions. For me, being an international student and the first time in the UK, the friendliness and helpfulness of the Health Informatics teaching team ensured happy and successful completion of my course.

After completion of the course, I was confident enough to organise an international conference on Telemedicine in Bhutan with support from the United Nations, to strengthen Telemedicine within the country and networks in the South Asian Association for Regional Corporation (SAARC) countries. However, the most satisfying project I spearheaded was the Health Help Centre (HHC) – a 24/7 access to healthcare advisory services and emergency medical services through toll free number 112. It also included disease algorithms, EMR and GIS systems for providing medical helpline and ambulatory services."

Gaki Tshering, Thimphu Kingdom of Bhutan

Head of ICT Unit, Ministry of Health, Royal Government of Bhutan

Graduated from the MSc in Health Informatics at Swansea University in 2006

Health Informatics

MSc/PGDip/PGCert

Course Modules

The following modules and dissertation are compulsory and must be undertaken when completing the programme.

Core Modules (each assigned 20 credits)

PMIM 101	Health Informatics in Context
	In this module, students will study the skills required by the professional health informatician including an introduction to information governance, privacy and the maintenance of confidentiality, data security, legislation, ethical considerations, and current UK and global eHealth strategies. Students will also begin to develop their academic skills in literature searching, the critical evaluation of research literature and reflective practice.

PMIM 201	Communications and Coding
	In this module, students will learn about communication and communication systems. This will include a study of electronic health records and clinical coding systems. Academic skills are developed and enhanced by an introduction to qualitative research methods.

PMIM 301	Using Secondary Health Data
	Students will study data quality and management, secondary uses of clinical data, service improvement and clinical audit. Academic skills are developed and enhanced by an introduction to quantitative research methodologies. Students will be introduced to statistical software such as SPSS.

PMIM 401	Systems and Technologies
	In this module, students will study the information systems and technologies used in health informatics projects and their implementation. These include: networks; the Internet; integrated communications; mobile communications; health information systems. Academic skills are further developed by studying how systematic reviews of literature are undertaken.

PMIM 501	Knowledge Management
	In this module, students will study knowledge management in health care environments. The themes covered will include: clinical decision-making; decision support systems; workflow management; web site design. Students will study experimental research designs.

Optional Modules (each assigned 20 credits)

PMIM 601	**Undertaking Health Informatics Research**
	In this module, students will develop their research skills by learning how to write a research proposal and prepare for the research dissertation.

PMIM 603	**Leadership in Project Management**
	This module concentrates on leadership in project management, and examines contemporary project management methodologies, strategies and the skills required for effective leadership of a project.

Dissertation Options

PMIM 701	**Health Informatics Research Dissertations**
	This module builds on the knowledge and skills developed in part one of the course. Students will work independently in order to critically explore and add to the evidence base for a topic of relevance to health informatics.

PMIM 703	**Project Management Dissertations**
	In this module students use work based learning and experience in the construction of a work based portfolio, which will reflect on the leadership of a health informatics project.

Health Informatics

MSc/PGDip/PGCert

Course Factsheet

Type	Postgraduate Degree Course, Taught Masters Programme.
Duration	1 year full time or 3 years part time study, with minimum attendance requirements.
Availability	The course duration runs from September to September each academic year.
Course aims	This course has been running successfully since 2001 and has an international reputation. The course aims to increase your knowledge and skills to help shape your career path in health informatics, whilst equipping you for your role as a professional health informatician.
Accredited by	This course is accredited by the UK Council for Health Informatics Professions (UKCHIP) Education Quality Assurance Scheme (EQAS). All who successfully complete can apply for free affiliate registrations with UKCHIP, which is recognised and valued by employers.
Based in	The course is based within the award winning Centre for Excellence for eHealth Research (The Farr Institute) as awarded by the Medical Research Council (MRC), and also the Centre for Excellence for New Innovative Administrative Data Research (Administrative Data Research Centre Wales) awarded by the Economic Social and Research Council (ESRC), thus enhancing the quality of the course.
Designed for	This course is designed for healthcare professionals and those who want to increase their knowledge and skills in health informatics, and graduates preparing for a career in health informatics. Applications from non-graduates with domain experience are welcome.
Pre-requisites	A good general understanding of what health informatics is, and experience in the field is preferred.
Teaching	This course has a number of senior academics who deliver lectures and use state of the art technology, innovative assessment methods, with a strong focus on practical experience and personal tutorial support.
Student support	The course website also provides online tuition in academic writing skills and further support via communication networks to peers and lecturers, as well as a dedicated personal tutor allocation. Swansea University offers a number of support services including a range of British Council approved programmes to help overseas students meet their academic goals. Other services include wellbeing, finance, disability, medical conditions and specific learning difficulties, alongside international student advice services.
Course structure	Students must complete 6 modules (5 core and 1 optional module) to earn a minimum of 120 credits in total in Part One and produce a dissertation in Part Two in order to graduate. This will be augmented by preparatory and reflective material supplied via the course website, before and after your visit.

Attendance	Students are required to attend the university for 1 week (five consecutive days) for each module in Part One. Attendance in Part Two is negotiated with the supervisor.

Requirements

Admission to this course is normally on the basis of a UK Honours Degree grade 2:2 or above, or an equivalent qualification for overseas applicants. Undergraduates of any of the following cognate disciplines should consider applying for this course:

- Healthcare professionals/management/technology
- Health information/data management
- Medical/clinical coding/medical records
- IT and computer/health/social/sports science
- Health economics
- Nursing and social work/care

English Language

Applicants whose first language is not English must provide evidence of one of the following qualifications:

- IELTS Academic: 6.5 overall (minimum of 6.0 in each component)
- TOEFL IBT: 93 (20 in each part)
- Pearson PTE Academic: 62 (51 in each communicative skill)
- Cambridge CPE: Grade C
- Sijil Pelajaran Malaysia: Grade 6 or above

Tuition fees

International Students
1 year full time programme: please see list attached for tuition fees

UK Home and EU students
1 year full time programme: please see list attached for tuition fees
3 years part time programme: please see list attached for tuition fees

How to apply

Online application www.swansea.ac.uk/postgraduate/apply/how

Contact us

Tony Paget
Course Director and Associate Professor of Health Informatics
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Judy Jenkins
Admissions Tutor and Lecturer in Health Informatics
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Data Science Building
Singleton Park
Swansea SA2 8PP
Wales, United Kingdom.

Website: www.mschealthinformatics.swansea.ac.uk

Health Informatics

MRes (Master of Research)
Part time

The developing discipline of health informatics is becoming an increasingly important component of health provision in the 21st Century. This programme builds on the successful MSc in Health Informatics which has been running at Swansea University since 2001.

The focus is on primary research, undertaken over 2 years. Research skills are developed through three short modules as the student develops their own health informatics research project in the first 9 months of the course. The research project may be undertaken within the student's own place of work.

This course is designed for those with experience in health informatics who want to make a contribution to the field by helping develop the knowledge base.

Contact

Tony Paget, Course Director and Associate Professor of Health Informatics
Phone: +44(0)1792 602874
Email: a.m.paget@swansea.ac.uk

MODULES TYPICALLY INCLUDE

Students must undertake the following 3 modules, totalling 60 credits at M level in their first academic year.

- Critical Appraisal and Evaluation
- Any one existing health informatics module relating to the chosen topic
- Undertaking health informatics research

The second year will comprise supervised completion of a research based thesis. The requirements for supervision and review, as set out for standard research degrees, will be integrated into the course.

ENTRY REQUIREMENTS

Admission to this course is normally on the basis of UK Honours Degree Grade 2:2 or above or an equivalent qualification for overseas applicants. Applications from non-graduates with domain expertise are welcome.

Professional Development
Masters Level Courses

Leadership in Project Management

This Leadership in Project Management course is a continuing professional development course, designed to meet the needs of those wishing to gain knowledge and expertise of the skills required for the successful leadership of complex projects.

It examines the common causes of project failure and explores the contribution that strong leadership makes to successful delivery. Based on a series of linked lectures and group exercises that give participants the opportunity to assess, analyse and practice the different aspects of leadership style required to build confidence and credibility by:

- Managing stakeholder relationships, through open communication
- Creating a good project reputation, through public relations
- Crisis management, when projects do not go strictly to plan

It recognises the importance of tools and techniques for project management and covers:

- Risk Assessment and Management
- Portfolio Management of Programmes and Projects
- PRINCE Project Management
- Professionalism in Practice

Learning outcomes
Upon successful completion, you will be able to select and apply the correct methodologies in relation to managing a project, differentiate between leadership and management, the importance of managing change, enhance your team working and communication skills, and learn how to become assertive in the work place.

You will enhance and improve your personal and career potential, by exploring leadership styles and their practical application in managing complex projects.

Who should attend
The course is designed to meet the needs of anyone who wishes to develop their career by gaining skills, knowledge and expertise in leading complex projects. It would be most beneficial to people who have already had some experience of managing projects or are about to take higher levels of responsibility for more complex projects. It will also be valuable to anyone in the public and private sector.

Pre-requisites
A general understanding of what project management entails, and a willingness to explore the subject in depth. Candidates need not have managed projects before in order to attend this course, but may be looking to take on work related project management in the future.

Course credits
The Leadership in Project Management course is part of the MSc Health Informatics module (PMIM 603) which carries 20 Master Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.
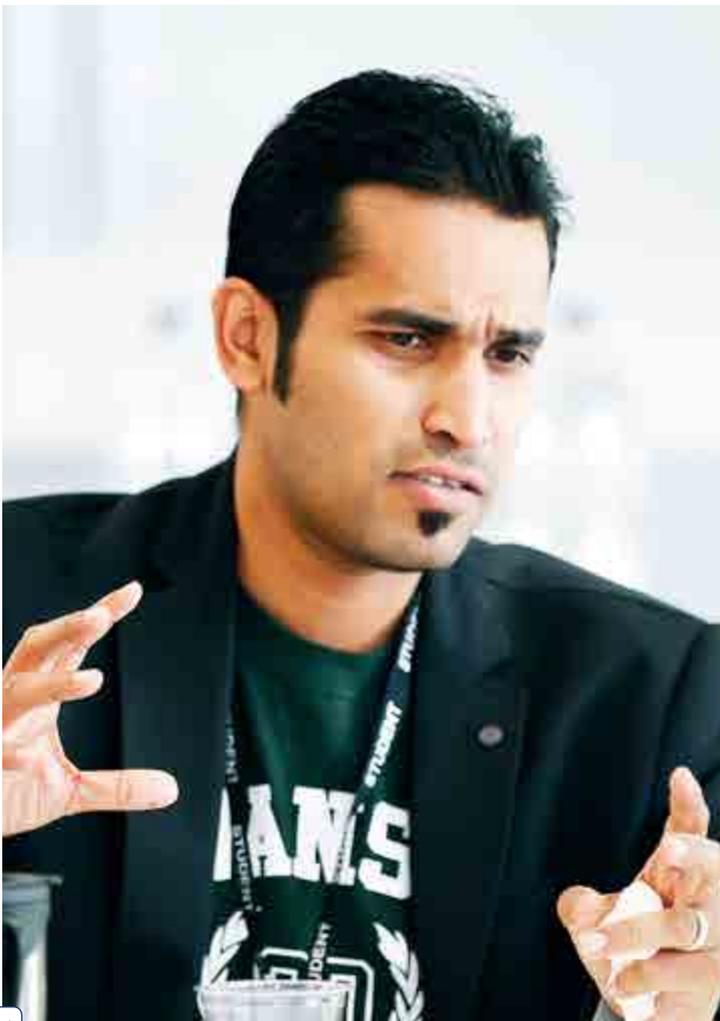
Duration
This course is delivered over a week for five consecutive days.

Course fees
Please see list attached for UK/EU fees. For international students please enquire for further details of course fees.

Contact
Judy Jenkins, Admissions Tutor and Lecturer in Health Informatics
Phone: +44(0)1792 602873
Email: j.jenkins@swansea.ac.uk

Health Data Science

An integrated programme of studies tailored to the essential skill set required for Data Scientists operating within healthcare organisations covering key topics in computation, data modelling, visualisation, machine learning and key methodologies in the analysis of key linked health data.

Hands on experiential learning from the professionals behind the Secure Anonymised Information Linkage (SAIL) Databank, a UK exemplar project for the large scale mining of healthcare data within a secure environment.

Strong collaboration links with colleagues from the Centre for Health Services Research of the University of Western Australia, a group of leading experts in the analysis of linked health data.

Study with us

www.swansea.ac.uk/mschealthdatascience

MScHealthData Science

MSc_HDS

MSc_HealthDataScience_SU

Hands-on po

Postgraduate education in large scale data processing with a special focus on healthcare data

Considering a Career in Health Data Science?

> By 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data (health) to make effective decisions. **"**

McKinsey Global Institute Study

Referred to by the Harvard Business Review as the "most sought after job" of the 21st century

Now
HIRING

1200 job posts listed when searching for "Health Data Scientist" on a weekly basis.

www.Indeed.co.uk and
www.Indeed.com

THE FACTS

The job market is growing at an exponential pace in the UK and US

Highly-demanded and most sought after talent in the UK and US

Demand far outpaces the supply by 50 - 60% in the US

Earns an average salary of £39,692 in the UK reported by Payscale

eHealth is a major field at the centre of attention for governments across Europe
Visit www.ehealth-strategies.eu to check progress in your country

Health Data Science

MSc/PGDip/PGCert
Full time or part time

Healthcare, with an already established strong relationship with Information and Communication Technologies (ICT), is continuously expanding the knowledge forefront as new methods of acquiring data concerning the health of human beings are developed.

Processing this data to extract valuable information about a population (epidemiological applications) or the individual (personalised healthcare applications) is the work of health data scientists. Their work has the potential to improve quality of life on a large scale.

**UK*chip*
EQAS**

MODULES TYPICALLY INCLUDE

- Scientific Computing in Healthcare
- Health Data Modelling
- Analysis of Linked Health Data
- Machine Learning in Healthcare
- Health Data Visualisation
- Advanced Analysis of Linked Health Data
- Health Data Science Dissertation

ENTRY REQUIREMENTS

Candidates with two years of relevant employment are welcomed, as well as graduates of a relevant discipline with an Honours classification of 2.2 or above, or an equivalent recognised qualification.

Our fellow alumni testimonials

"The MSc Health Data Science programme has allowed me to develop my role within the Health Board utilising the skills and learning around health data modeling and linked data analysis to enhance existing data reporting within Cardiac Services across Wales"

Richard Thomas, United Kingdom
All Wales Cardiac Informatics Manager,
Aneurin Bevan University Health Board

Health Data Science

MSc/PGDip/PGCert

Course Modules

The following modules and dissertation are compulsory and must be undertaken when completing the programme.

Core Modules (each assigned 20 credits)

PMIM 102	**Scientific Computing in Health Care**
	The module aims at raising the awareness of students about scientific computing. It provides a brief overview of computation and focuses on the computational needs and work flows that health data scientists most often employ. Students will also learn about the professional context within which health data scientists operate.

PMIM 202	**Health Data Modelling**
	Health data scientists are expected to work with diverse data sources. However due to the abstraction offered by modern database management systems, these data sources can be treated similarly through a set of standardised operations. The objective of this module is to raise the awareness of students about the process of data modelling and the key operations involved in the data processing of large and diverse datasets.

PMIM 302	**Analysis of Linked Health Data**
	This module introduces the topic of linked health data analysis at an introductory to intermediate level. It fills a gap in research training opportunities by combining the principles of health care epidemiology with hands-on practical exercises in the implementation of computing solutions. The module provides students with a theoretical grounding in the classroom on each topic, followed by a training session on the corresponding computing solutions. Students use de-identified linked data files in the hands-on exercises. The computing component of the module assumes a basic familiarity with computing syntax used in programs such as SPSS, SAS or STATA and methods of basic statistical analysis of fixed-format data files.

PMIM 402	**Machine Learning in Healthcare**
	Data scientists working in healthcare are called to deal with problems involving classification and pattern recognition. The objective of this module is to provide the essential theory and practical aspects of widely used machine learning software.

PMIM 502	**Health Data Visualisation**
	Health data scientists making use of computational and storage resources will eventually be called to present their findings to an audience. The objective of this module is to enable students to choose and produce appropriate static and dynamic visualisations of health data using a range of media.

PMIM 602	**Advanced Analysis of Linked Health Data** This module is taught at an intermediate to advanced level and assumes that students have completed PMIM 302 Introductory Analysis of Linked Health Data or have equivalent knowledge. Advanced principles of health care epidemiology are combined with hands-on practical exercises in the implementation of computing solutions. The module provides students with a theoretical grounding on each topic, followed by a training session on the corresponding computing solutions. Students use de-identified data files in the hands-on exercises, The computing component of the module assumes a basic competence in the preparation of computing syntax for programs such as SPSS, SAS or STATA and familiarity with the statistical analysis of linked data files at an introductory to intermediate level.

Dissertation Options

PMIM 702	**Health Data Science Dissertations** Students will work independently with a large scale linked data set, developing and answering a specific research question in order to produce a dissertation.

Health Data Science

MSc/PGDip/PGCert

Course Factsheet

Type	Postgraduate Degree Course, Taught Masters Programme.
Duration	1 year full time or 3 years part time study, with minimum attendance requirements.
Availability	The course duration runs from September to September each academic year.
Course aims	This course is designed to develop the essential skills and knowledge required of the Health Data Scientist.
Accredited by	This course is accredited by the UK Council for Health Informatics Professions (UKCHIP) Education Quality Assurance Scheme (EQAS). All who successfully complete can apply for free affiliate registrations with UKCHIP, which is recognised and valued by employers.
Based in	The course is based within the award winning Centre for Excellence for eHealth Research (The Farr Institute) as awarded by the Medical Research Council (MRC), and also the Centre for Excellence for New Innovative Administrative Data Research (Administrative Data Research Centre Wales) awarded by the Economic Social and Research Council (ESRC), thus enhancing the quality of the course.
Designed for	This course is suitable for those working in healthcare with roles involving the analysis of health data and also computer scientists with experience in working with data from the healthcare domain, as well as biomedical engineers and other similar professions.
Pre-requisites	Admission to this course is normally on the basis of UK Honours Degree Grade 2:2 or above or an equivalent qualification for overseas applicants. Non-graduates are also welcome to apply. All applications are considered on individual merit, taking into account any relevant work experience. Should you have qualifications below the required minimum or lack a suitable first degree, please feel encouraged to submit an application if you have at least two years of experience in Health and/or Data Science related fields.
Teaching	This course has a number of senior academics who deliver lectures and use state of the art technology, innovative assessment methods, with a strong focus on practical experience and personal tutorial support.
Student support	The course website also provides online tuition in academic writing skills and further support via communication networks to peers and lecturers, as well as a dedicated personal tutor allocation. Swansea University offers a number of support services including a range of British Council approved programme to help overseas students meet their academic goals. Other services include wellbeing, finance, disability, medical conditions and specific learning difficulties, alongside international student advice services.

| Course structure | Students must complete 6 modules to earn a minimum of 120 credits in total in Part One and produce a dissertation in Part Two in order to graduate. This will be augmented by preparatory and reflective material supplied via the course website, before and after your visit. |

| Attendance | Students are required to attend the university for 1 week (five consecutive days) for each module in Part One. Attendance in Part Two is negotiated with the supervisor. |

| Requirements | Admission to this course is normally on the basis of a UK Honours Degree grade 2:2 or above, or an equivalent qualifications for overseas applicants. Undergraduates of any of the following cognate disciplines should consider applying for this course: |

- Computer Science
- Applied Mathematics
- Biomedical Engineering
- Medicine

English Language

Applicants whose first language is not English must provide evidence of one of the following qualifications:

- IELTS Academic: 6.5 overall (minimum of 6.0 in each component)
- TOEFL IBT: 93 (20 in each part)
- Pearson PTE Academic: 62 (51 in each communicative skill)
- Cambridge CPE: Grade C
- Sijil Pelajaran Malaysia: Grade 6 or above

Tuition fees

International Students

1 year full time programme: please see list attached for tuition fees

UK Home and EU students

1 year full time programme: please see list attached for tuition fees
3 years part time programme: please see list attached for tuition fees

How to apply

Online application www.swansea.ac.uk/postgraduate/apply/how

Contact us

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Wales, United Kingdom

Website: www.swansea.ac.uk/mschealthdatascience

Professional Development
Masters Level Courses

Introductory Analysis of Linked Health Data

The Introductory Analysis of Linked Health Data is an intensive five-day course on the theory and practice of analysis of large sets of linked health and social data at an introductory to intermediate level.

Rapid growth in data linkage projects has led to a shortfall in analyst skills. Some researchers understand epidemiological principles, but are unfamiliar with the specialised computing skills needed to analyse linked data files.

Others have a strong grasp of computing concepts, but lack an adequate theoretical base to design high quality applications to answer research questions. This course endeavours to fill a gap in training opportunities to meet these two areas of need.

The course caters to users of SPSS, SAS or Stata with course materials and exercises covering all three statistical software packages. The course provides a theoretical grounding in the classroom on each topic, followed by a practical training session on the corresponding computing solutions.

Students use fictitious but realistic linked data files in the hands-on exercises. The course instructor is available in the computing laboratory session each afternoon and conducts one-one-one coaching for those who need assistance.

Learning outcomes
The course acquaints health and social researchers, clinical practitioners and managers with the theory and skills needed to analyse linked health and social data at the introductory to intermediate level.

Upon completion the participant will:
- possess an overview of the theory of data linkage methods and features of comprehensive data linkage systems, sufficient to understand the sources and limitations of linked data sets;
- understand the principles of epidemiologic measurement and research methods for the conceptualisation and construction of numerators and denominators used in the analysis of health and social phenomena, including services utilisation and outcomes;
- understand sources of measurement error in linked data, the difference between confounding and effect modification, and use of regression models in risk management in health and social research;
- be able to perform statistical analyses on linked longitudinal health and social data;
- be able to conceptualise and perform the manipulation of large linked data files;
- be able to write statistical syntax to prepare linked data files for analysis, derive exposure and outcome variables, relate numerators and denominators and produce results from statistical procedures.

Who should attend
This course is ideal for health and social care researchers, social scientists, clinical practitioners and health care managers who wish to build on their pre-existing theoretical knowledge and skills in the analysis of linked health data.

Pre-requisites
Basic familiarity with computing syntax used in either SPSS, SAS or Stata and methods of basic statistical analysis of fixed-format data files.

There are no formal pre-requisites in epidemiology for the course. However, it is recommend that participants who have not previously completed an introductory course in epidemiology, familiarise themselves with the basic principles and terms used in that discipline. A working knowledge of statistical concepts, including regression models, used in data analysis in the medical and social sciences is assumed.

Course credits
The Introductory Analysis of Linked Health Data (PMIM 302) module is part of the MSc Health Data Science course which carries 20 Masters Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration
This course is delivered over a week for five consecutive days.

Course fees
Please see list attached for UK/EU fees. For international students please enquire for further details of course fees.

Contact
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Advanced Analysis of Linked Health Data

Advanced Analysis of Linked Health Data is an intensive course of five days in duration, designed to instruct participants in the theory and practice of analysis of large sets of linked health data at an intermediate to advanced level. Advanced principles of health care epidemiology are combined with hands-on practical exercises in the implementation of computing solutions.

The modular structure of the unit provides students with a theoretical grounding in the classroom on each topic, followed by a training session on the corresponding technological computing solutions. Students use fictitious but realistic linked data files in the hands-on exercises. One-on-one coaching and instruction is available in the computing laboratory session each afternoon on how to problem-solve complex research scenarios covered by the hands-on exercises.

The course caters to users of SPSS, SAS or Stata with course materials and exercises covering all three statistical software packages. The course provides a theoretical grounding in the classroom on each topic, followed by a practical training session on the corresponding computing solutions.

Students use fictitious but realistic linked data files in the hands-on exercises. The course instructor is available in the computing laboratory session each afternoon and conducts one-one-one coaching for those who need assistance.

Learning outcomes

The course practice data sets provide health and social researchers with the opportunity to build on their pre-existing theoretical knowledge and skills in the analysis of linked data by exploring a number of advanced topics.

Upon completion the participant will:

- have consolidated their grasp of foundation concepts of epidemiology and linked data analysis;
- possess an advanced understanding of methods for the conceptualisation and construction of valid measures and effect measures of health and social services utilisation and outcomes based on complex, multi-sourced linked data sets;
- understand complex longitudinal research designs and how to implement them using large multi-sourced linked data sets;
- understand advanced 'modern epidemiology' theoretical principles including case-distribution study designs and how to practically implement them using large multi-sourced linked data sets;
- have skills in the analysis of linked hospital morbidity, mortality, institutional, pharmaceutical and primary care data;
- be able to write computing syntax to prepare complex linked data files for analysis; derive exposure and outcome variables, relate numerators and denominators and produce results from advanced statistical procedures.

Who should attend

This course is ideal for health and social care researchers, social scientists, clinical practitioners and health care managers who wish to build on their pre-existing theoretical knowledge and skills in the analysis of linked health data.

Pre-requisites

This course assumes that participants have completed the Introductory Analysis of Linked Health Data module or have equivalent knowledge

arising from hands-on experience in the analysis of linked files with multiple and variable numbers of records per individual. The computing component of the unit assumes a basic competence in the preparation of computing syntax for either SPSS, SAS or Stata and familiarity with the statistical analysis of linked data files at an introductory to intermediate level.

It is recommend that participants who have not previously completed an introductory course in epidemiology, familiarise themselves with the basic principles and terms used in that discipline. A working knowledge of statistical concepts, including regression models, used in data analysis in the medical and social sciences is also assumed.

Course credits

The Advanced Analysis of Linked Health Data module (PMIM 602) is part of the MSc Health Data Science course which carries 20 Masters Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration

This course is delivered over a week for five consecutive days.

Course fees

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Professional Development
Masters Level Courses

Scientific Computing in Healthcare

Scientific computing is a key component of Data Science in healthcare because computation is what transforms data to information. Students of this module are exposed to key theoretical concepts underpinning the development of efficient algorithms such as data structures, broad computation constructs (iteration, recursion, expression and others) and computational complexity.

Learning outcomes
The course focuses on the imperative programming paradigm that is followed by the majority of scientific computation packages such as MATLAB, Octave, SPSS, R, SAS, Python, Julia and others. Other learning outcomes include the use of source version control, structured documentation and parallel computing.

Who should attend
The course is designed for researchers and other health professionals who have had some experience in writing code to solve problems and would be interested in getting up to speed quickly with the current state of the art technological advances.

Pre-requisites
Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Research experience is desirable but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits
The Scientific Computing in Healthcare module (PMIM102), carries 20 postgraduate level credits and these are awarded on completion of the module's assessment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration
This course is delivered over a week for five consecutive days.

Course fees
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Health Data Modelling

Data modelling is an integral part of efficient computation because it transforms physical entities (e.g. a blood pressure) into computable entities. The modern healthcare environment poses many challenges and opportunities for data modelling. Ranging from simple spreadsheet-like data, as found in NHS Quality Outcomes Frameworks (QOF's) to more complex datasets such as clinical trials.

Learning outcomes
The course focuses on demonstrating the key principles of data modelling and the broad structural patterns that govern the majority of database management systems in use today. In this way, the expository examples provided are easily transferable to emerging technologies.

Who should attend
The course is designed for researchers and other health professionals who have had some experience with relational databases and SQL before but would be interested in getting up to speed quickly with the current state of the art in database management systems that are used in healthcare.

Pre-requisites
Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Research experience is desirable but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits
The Health Data Modelling (Module PMIM 202) carries 20 Masters Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration
This course is delivered over a week for five consecutive days.

Course fees
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Machine Learning in Health Data

Data scientists working in healthcare are called to deal with problems involving classification and pattern recognition. The objective of this module is to provide the essential theory and practical aspects of widely used machine learning software.

Learning outcomes

Students will be able to examine the basic framework of data mining in general and machine learning in particular and their relationship with different clinical encoding and classification systems. They will also be able to compare and contrast basic data summarisation models developed within the field of data mining (such as classification, prediction, clustering and association models).

Who should attend

This is a technical course designed for beginners or individuals who may have had some involvement with databases through typical roles in a data analysis environment, and are seeking to expand their knowledge and understanding of manipulating healthcare related data through relational databases.

Pre-requisites

Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Research experience is desirable but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits

Machine Learning in Health Data (Module PMIM 402) carries 20 Masters Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration

This course is delivered over a week for five consecutive days.

Course fees

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Contact

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Health Data Visualisation

Health data scientists making use of computational and storage resources will eventually be called to present their findings to an audience. The objective of this module is to enable students to choose and produce appropriate static and dynamic visualisations of health data using a range of media.

Learning outcomes

Students will be able to examine the key elements of the human visual system and how it affects scene comprehension, identify the basic typographic and graphic elements available to a designer to structure an efficient static or dynamic presentation. They will also be able to critically evaluate and select graphical elements that are best suited for a presentation requirement, based on content and medium (e.g. journal publication, poster, online and other media).

Who should attend

This is a technical course designed for beginners or individuals who may have had some involvement with databases through typical roles in a data analysis environment and are seeking to expand their knowledge and understanding of manipulating healthcare related data through relational databases.

Pre-requisites

Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Research experience is desirable but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits

Health Data Visualisation (Module PMIM502) carries 20 Masters Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration

This course is delivered over a week for five consecutive days.

Course fees

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Professional Development
Undergraduate Level Courses

Introduction to Database Systems with Application to Health and Social Care

The Introduction to Database Systems with Application to Health and Social Care introduces students to a range of electronic database systems used in the field of health and social care and basic theoretical concepts and terminology applicable to these systems.

Learning outcomes
Students will be introduced to a range of commonly used data models including the relational data model which will be used as a vehicle for further exploration of electronic data storage.

Who should attend
This is a technical course designed for beginners or individuals who may have had some involvement with databases through typical roles in a data analysis environment and are seeking to expand their knowledge and understanding of manipulating healthcare related data through relational databases.

Pre-requisites
Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Research experience is desirable but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits
The Introduction to Database Systems with Application to Health and Social Care (Module PMIT 100) carries 20 Undergraduate Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration
This course is delivered over a week for five consecutive days.

Course fees
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Introduction to Scientific Computation of Health Data

The Introduction to Scientific Computation of Health Data course introduces students to the process of developing algorithms to solve scientific problems and to the use of scientific computation software to answer research questions within the context of healthcare.

Learning outcomes
This course will focus primarily on the imperative programming paradigm that is followed by the majority of scientific computation packages such as MATLAB, OCTAVE, SPSS, R, SAS, Python and others. This course will also cover the important aspects of code documentation and description via basic diagrams to enable students to integrate with large teams effectively.

Who should attend
This is a technical course designed for beginners or individuals who may have had some involvement with databases through typical roles in a data analysis environment and are seeking to expand their knowledge and understanding of manipulating healthcare related data through relational databases.

Pre-requisites
Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Research experience is desirable but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits
The Introduction to Scientific Computation of Health Data (Module PMIT 200) carries 20 Undergraduate Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration
This course is delivered over a week for five consecutive days.

Course fees
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Turning Clinical Information into Coded Data

The Turning Clinical Information into Coded Data course introduces students to the variety of clinical encoding systems used within the NHS and internationally as well as the tools used to review them and handle encoded data.

Learning outcomes
Students will be exposed to the basics of encoding systems such as ICD-10, READ, SNOMED, OPCS, LOINC and others, and gain practical experience in managing encoded data through the use of various tools and browsers.

Who should attend
This is a technical course designed for beginners or individuals who may have had some involvement with databases through typical roles in a data analysis environment and are seeking to expand their knowledge and understanding of manipulating healthcare related data through relational databases.

Pre-requisites
Basic ICT skills and a good knowledge of the healthcare environment are essential for participants to engage with the content of the course. Some experience with database systems is desired for part of the practicals but not essential.

Please note a laptop computer is essential for the delivery of this module.

Course credits
The Turning Clinical Information into Coded Data (Module PMIT 300) carries 20 Undergraduate Level Credits and these are awarded on completion of a successful assignment. However, students who wish to attend for Continuing Professional Development (CPD) purposes only, will omit the assessment and be given a Certificate of Completion.

Duration
This course is delivered over a week for five consecutive days.

Course fees
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Work Experience

Case Studies

> " Working with the SAIL Databank team was a great development opportunity for me. Within the 3-month span of this programme, I gained insight into areas of data linkage, quality assurance procedures of linked data, NHS data structure, information governance procedures and access request for projects. I highly encourage any early career individuals who want to pursue Data Science related careers, to pursue a working experience opportunity with SAIL. "

Fatemeh Torabi

Fatemeh Torabi
Studying MSc Health Data Science

"I went through a highly worthwhile experience which was arranged in collaboration between Swansea University Medical School and the SAIL Databank team.

The best things about my time with the SAIL Databank were:

- Receiving continuous support from Swansea University Medical School and the SAIL Databank team.
- Training in various areas.
- Taking responsibility for my own allocated project while receiving sufficient supervision from my line manager.
- The whole team made me feel like a member after the first week.

Specific Development Points:

- Developing an understanding of the use of large linked data sets for research.
- Gaining experience in contributing to linked data analysis.
- Learning project management and working methods for a development team.
- Had the opportunity to deliver a small project: Data Quality Assurance(DQA).
- Developed an understanding of the NHS data structure.
- Developed a firm understanding of the DQA procedure in various stages of research.
- Understanding other aspects of the operation of SAIL.
- Targeted code development for automating DQA procedure.
- Planning and scoping a project and facing the challenges that come after the initial stage.
- Using R Markdown.

I would recommend it as a very high quality and worthwhile experience. It can be helpful especially for early career researchers and students who want to gain more experience in this area."

Eric Mbuthia Kanyi
Studying MSc Health Informatics

"I had the opportunity to work within the SAIL (Secure Anonymised Information Linkage) Databank which is a world renowned research centre. It is located within the Swansea University Medical School's Data Science Building. Work at SAIL revolves around research using clinical and administrative data to provide useful information that can help understand past events and inform future decisions for the benefit of communities.

During my experience I joined a sub-team of the Research Analyst Team working to develop reusable procedures for common research questions which were asked on the data. Specifically, I worked on procedures to aid in calculating disease measures such as prevalence and incidence.

The best things about my time with the SAIL Databank were:
- Working with a very warm and talented team that were very quick to welcome me and help in understanding the work better.
- Being able to set up some one-on-one meetings with other members of the SAIL staff, outside the analyst team. They were kind enough to talk about their duties and their approach to their tasks which really helped me gain a better understanding of how SAIL operates.
- Being immersed in a real environment and gaining hands-on experience and applying concepts learnt in class.
- A better understanding of protocols necessary to provide some assurance of health data security.

- Learning about the hurdles faced and assumptions that need to be made when trying to analyse electronic medical records in the setting of linked data.
- Learning better project management and how to better support it with use of project management tools.

Specific Development Points:
- Communication skills especially working in a team with diverse backgrounds.
- Learning better project management and how to better support it with use of project management tools.
- A better understanding of protocols necessary to provide some assurance of health data security.
- Learning about the hurdles faced and assumptions that need to be made when trying to analyse electronic medical records in the setting of linked data.

Working with SAIL has been really useful in helping me understand the underpinnings behind building, managing, operating and reporting within large data analysis systems.

I would highly recommend students to take up similar opportunities where offered. As a student, be it at undergraduate or post-graduate level, one seeks to achieve mastery of their particular field of interest. This would not be in any way complete without gaining real, hands-on training and experience whether one was interested in a career in academia or to work within the field.

Working with SAIL was an excellent experience as one is exposed to information governance, information security and data quality processes all in the setting of research-driven projects within a multi-disciplinary team. One is also exposed to aspects of project planning, tracking and reporting which are useful skills to have in any work environment."