

ES9ZT-15 Group Research Project (Diagnostics/Imaging)

24/25

Department

School of Engineering

Level

Taught Postgraduate Level

Module leader

Georgia Kremmyda

Credit value

15

Module duration

20 weeks

Assessment

Multiple

Study location

University of Warwick main campus, Coventry

Description

Introductory description

Group research projects to be undertaken by students on the MSc in Diagnostics, Data and Digital Health.

Students will collaborate in multidisciplinary teams with imaging pathway students researching and utilising imaging skills and diagnostic pathway students researching and utilising diagnostic skills.

Module aims

The Group Research Project is a group project aiming to give students experience of working within a team, and parallel the way imaging and diagnostics experts work in industry. Students will integrate their knowledge and understanding in order to research into and solve a problem (or user need).

The project also aims to enable students to develop their understanding of project management, time management, ethics, sustainability, health and safety, risk management and intellectual property rights. Students will develop effective communication and leadership skills, for both technical and non-technical audiences.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The project will develop the group's ability to analyse contemporary issues in their areas of expertise, for example, through the collection, processing and analysis of data by way of primary research, or systematic review of service evaluation projects. Each project team will research diagnostics and imaging tools and technologies capable of transforming outcomes for diseases adversely impacting diverse patient populations.

In each case the project will normally involve small groups (the aim is to have around 6 students). Projects will have relevant medical industry backing where possible or at least be able to demonstrate applicability to the fields of diagnostics and imaging.

Students will be encouraged to assume different roles within the team including that of project manager, secretary and/or treasurer. A member of staff appointed as Project Director, will provide guidance on technical and organisational matters. Regular meetings will take place with formal minutes to provide a record of decisions.

Teaching support is provided by means of specially oriented technical seminars. These seminars will have the objective of strengthening the skills required for the successful completion of the project and can include topics relating to digital therapeutics, digital diagnostics, data analytics, artificial intelligence and the ethical, policy, regulatory and practice challenges facing the field of digital health. Invited technology specialists and health practitioners to academic lectures will provide the students with the ability to understand the challenges of working in this field and developing innovative solutions.

A group presentation will take place after 5 weeks working on the project, testing the students' ability to effectively communicate complicated ideas, systems, or processes. The group will describe the project to an academic audience and answer technical and non-technical questions.

Furthermore, it will require a formal write-up describing its delivery in detail, from conception to testing. Including health and safety, risk management and a reasoned financial cost-benefit analysis. The individual technical contribution of each student will conform a technical appendix, which will be assessed.

Learning outcomes

By the end of the module, students should be able to:

- Critically appraise medical imaging and diagnostic technologies in advancing 21st-century healthcare
- Demonstrate the ability to articulate diagnostic reasoning with reference to underpinning clinical science
- Critically evaluate relevant data so as to apply analysis and advanced problem solving skills in order to quantify the impact of these findings on the solution and, using theory or research, to mitigate deficiencies.

- Consider the wider context of the project, including risk, health and safety, ethics, environmental and sustainability limitations, intellectual property rights, codes of practice and standards, product safety and liability(as appropriate), to inform the project solution
- Plan and manage a project from the design process to a deliverable outcome, including managing a budget and costs, and understand the commercial, economic and social environment of the project.
- Demonstrate effective communication, both verbal and written, to a technical and non-technical audience
- Demonstrate the ability to work as a member of a team to achieve shared objectives and project management goals within the scope of the project, then monitor and adjust a personal programme of work on an on-going basis
- Systematically engage to the scientific principles underpinning the format and application of medical imaging and diagnostic technologies

Indicative reading list

Catherine Pope & Nicholas Mays (Eds) (2020). *Qualitative Research in Health Care*. Wiley Blackwell.

Richards, D.A., Rahm Hallberg, I. (eds). (2015). *Complex Interventions in Health: an Overview of Research Methods*. London, Routledge.

Adjekum, A., Ienca, M., & Vayena, E. (2017). What Is Trust? Ethics and Risk Governance in Precision Medicine and Predictive Analytics. *OMICS A Journal of Integrative Biology*, 21(12), 704–710. <https://doi.org/10.1089/omi.2017.0156>

Aicardi, Christine, Del Savio, L., Dove, E. S., Lucivero, F., Tempini, N., & Prainsack, B. (2016). Emerging ethical issues regarding digital health data. On the World Medical Association Draft Declaration on Ethical Considerations Regarding Health Databases and Biobanks. *Croatian Medical Journal*, 57(2), 207–213. <https://doi.org/10.3325/cmj.2016.57.207>

Research element

Research purposes: research goals and questions;

Hypothesis and assumption: paradigm perspective, methodological choice, validity and credibility;

Design procedures: conceptual design, theoretical modeling and analysis, and fabrication;

Research outcomes: synthesis of conclusions and inferences.

Interdisciplinary

The module will allow students to research various topics in diagnostics, data and digital health that are interdisciplinary in nature, with disciplines spanning from engineering, life sciences to physical sciences (chemistry, physics etc).

Subject specific skills

1. Ability to critically appraise current technologies to answer biomedical questions and translate basic science to preclinical and clinical research
2. Understand the multi and interdisciplinary aspects of translational research
3. Ability to be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality
4. Ability to be a risk, cost, and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional responsibilities

Transferable skills

1. Apply appropriate methodologies and techniques to solve a problem
 2. Exercise initiative and personal responsibility, including time management, which may be as a team member or leader
 3. Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.
 4. Communicate (written and oral; to technical and non-technical audiences) and work with others
 5. Overcome difficulties by employing skills, knowledge and understanding in a flexible manner
 6. Ability to formulate and operate within appropriate codes of conduct, when faced with an ethical issue
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Study

Study time

Type	Required
Seminars	10 sessions of 1 hour (7%)
Project supervision	(0%)
Supervised practical classes	10 sessions of 2 hours (13%)
Private study	30 hours (20%)
Assessment	90 hours (60%)
Total	150 hours

Private study description

Students are expected to contribute a total of 120 hours to the project with 30 hours of private study preparing for group report and group presentation (90 hours).

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A

	Weighting	Study time	Eligible for self-certification
Group Presentation	30%	30 hours	No
A group oral presentation where the whole team will describe the project to an academic audience and answer questions on its delivery. Peer assessment is included.			
Group Report	70%	60 hours	No
A formal write-up of the project, describing its delivery in detail, from conception to testing. Including health and safety, ethics, risk management and a reasoned financial cost-benefit analysis. This executive report has a maximum length of 40 pages. Peer assessment is included.			

Assessment group R

	Weighting	Study time	Eligible for self-certification
Individual Report and Presentation	100%		No
A formal write-up of a project, describing its delivery in detail, from conception to testing. Including health and safety, risk management and a reasoned financial cost-benefit analysis. This executive report has a maximum length of 10 pages. The student will be invited to present for up to 10 mins answering technical and non-technical questions.			

Feedback on assessment

Verbal formative feedback during group meetings with Project Director
Written feedback on the group presentation and group report

Availability

Courses

This module is Core for:

- TESA-H1CA Postgraduate Taught Diagnostics, Data and Digital Health

- Year 1 of H1CA Diagnostics, Data and Digital Health
- Year 1 of H1CB Diagnostics, Data and Digital Health (Medical Diagnostics)
- Year 1 of H1CC Diagnostics, Data and Digital Health (Medical Imaging)