

Programme Specification Pro-forma (PSP)

1. GENERAL INFORMATION

1. Programme Title:	Applied Instrumentation and Control
2. Final Award:	MSc Applied Instrumentation and Control
3. Exit Awards:	PgD Applied Instrumentation and Control PgC (Untitled)
4. Awarding Body:	Glasgow Caledonian University
5. Period of Approval:	2022-2026
6. School:	Computing, Engineering and Built Environment
7. Host Department:	Applied Sciences
8. UCAS Code:	
9. PSB Involvement:	Institute of Measurement and Control
10. Place of Delivery:	Glasgow Caledonian University CENU Sultanate of Oman
11. Subject Benchmark Statement:	QAA Qualification Descriptors for Masters Degrees
12. Dates of PSP Preparation/Revision:	April 2021

2. EDUCATIONAL AIMS OF THE PROGRAMME

The aims of the programme are to enable the student to acquire:

- an understanding of the principles and implementation of instrumentation, and control systems;
- an understanding of the importance of efficient and reliable measurement and control systems to a range of industries;
- the skills and knowledge to conduct contracts and projects efficiently, ethically and safely;
- an ability to design and commission new instrumentation and control systems and troubleshoot existing systems;
- managerial, communication and information technology skills;
- have the ability to cope with future technological change;
- equip the student with a sufficiently wide perspective of the subject area so that a number of different approaches to a problem can be identified; to evaluate each of these solutions and to select which would be most appropriate.

The additional aim of the MSc Project component of the programme is:

- to expand the student's expertise by providing the opportunity to undertake a significant piece of independent work.

3. INTENDED LEARNING OUTCOMES

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas: [cross refer to the appropriate benchmark statement]

3A Knowledge and understanding;

The graduate will gain a comprehensive knowledge and understanding of:

- A1 the facts, concepts and application of mathematics to instrumentation and control.
- A2 the facts, concepts, principles, theories and application of science relevant to applied instrumentation and control.
- A3 the facts, concepts, and application of technology relevant to applied instrumentation and control.
- A4 the concepts, and principles of design relevant to applied instrumentation and control.
- A5 the facts, concepts, and application of IT relevant to applied instrumentation and control.
- A6 the concepts and application of project management principles relevant to applied instrumentation and control.
- A7 the facts, concepts and application of safety and ethics relevant to the development of instrumentation and control solutions.
- A8 the concepts and application of quality assurance principles relevant to applied instrumentation and control.

3B Practice: Applied knowledge, skills and understanding;

The graduate will have the intellectual skills to:

- B1 solve complex problems related to instrumentation and control.
- B2 obtain, analyse, and interpret data from complex systems and processes.
- B3 critically evaluate complex systems and processes.
- B4 design components, complex systems and processes.
- B5 undertake research in the area of applied instrumentation and control.

3C Generic cognitive skills;

- C1 take account of technological, ethical and commercial constraints in achieving engineering solutions.
- C2 develop, monitor and update a plan, to reflect a changing operating environment
- C3 undertake practical testing of design ideas, either in the laboratory or through simulation, with technical analysis and critical evaluation of results.
- C4 develop, promote and apply safe and ethical systems of work.
- C5 Think critically and solve problems.

3D Communication, numeracy and ICT skills

- D1 Information retrieval skills.
- D2 IT Skills.
- D3 Communication skills, written, oral and listening.
- D4 Numeracy skills.

3E Autonomy, accountability and working with others.

- E1 Time management (organising and planning work).
- E2 Independent working.
- E3 Planning, monitoring, reviewing and evaluating own learning and development.
- E4 Operate effectively within a group to achieve an effective engineering solution.

Delivery Models

The programme is offered to Full Time (FT) students based on campus in Glasgow, to Distance Learning (DL) students who may be based anywhere, in conformity with their employment, and to Part Time (PT) students who are based at the College of Engineering of the National University (CENU) of the Sultanate of Oman.

Instrumentation Trimester (A)

Data Capture	System Health Management	Signal Conditioning and Analysis	Measurement systems
---------------------	---------------------------------	---	----------------------------

Control Trimester (B)

Control Systems 1	Professional Practice
Control Systems 2	
Model Predictive Control	

Full Time delivery Model

The taught modules are grouped into an 'instrumentation' trimester and a 'control' trimester. Therefore there are no prerequisite constraints allying to the order in which the trimesters may be taken. This will permit an entry point at the beginning of trimester B without compromising the student experience.

Modules which are shared with other programmes are offered in 12 week delivery mode. The three control module, in contrast, are of necessity progressive in the nature of their content and as such are delivered in consecutive blocks. These modules are offered in this format uniquely to this programme.

The **distance learning** students follow an individually negotiated schedule, normally involving one or two modules per trimester, possibly including trimester C as well. The DL mode of attendance may be entirely asynchronous, which maximises the flexibility of the delivery to a group of students with widely varying working schedules, based in potentially distant time zones. The availability of VoIP technology does, however, permit the possibility of remote attendance at synchronous class activities and, where convenient, DL students will be invited to join activities created with the FT cohort primarily in mind.

In the case of **Part Time** students, attending CENU The programme will be delivered by GCU staff through teaching visits to the College of Engineering. Each module will be taught in two blocks of weekend teaching. It ensures a minimum of 16 hrs of contact classes delivered by GCU staff (Block1) for each taught module during the weekend delivery mechanism and then followed by teaching and support classes extended by NU staff through minimum 16 hrs of contact classes(Block2) plus a number of hours of directed learning depending on the requirements of the module. In addition to this, another 14-24 hours of notional effort will be used for assessment, depending upon the nature of the assessment for that module.

Learning Activities

Each module will be supported through the managed learning environment, GCUlearn, which provides on-line support such as: general staff and student announcements and information; course documents (in a wide range of formats); discussion board; and a virtual classroom (real-time student support, including an electronic white board and a mechanism for real-time Q & A between tutors and students).

Practical work is considered to be an important element of the programme. In addition to practical laboratory work in support of specific topics within the modules, a significant element of our teaching strategy is the multi-purpose use of LabVIEW®, a graphical programming environment, which will be installed in a laboratory - designed with this MSc programme in mind. This approach will encourage the students to integrate their activities and use elements that have already been learned in other modules. Other applications used in the programme and available for student use include MATLAB and MAdE (Maintenance Aware Design)

Distance learning students will be provided with the necessary software, simulation/ interface hardware and detailed instruction sheets to allow them to complete coursework assessments off-campus. The practical working and group working elements of the student experience are covered by the DL students' working activities. (relevant experience and current employment is a condition of acceptance on the DL route)

Tutorial work will contain a significant element of design and will be driven through the use of assignments – both individual and in groups. The assessment models for the taught modules are chosen in conformity with the learning outcomes. The module is either assessed by means of a combination of formal examination and coursework or by coursework alone. Coursework may include : poster displays; individual or group student oral presentations; computer-based exercises; class tests, reports and design exercises.

The Project

The MSc project is a very important component of the programme accounting for one third of the overall assessment. The prominence of the project is deliberate since it brings together the theoretical and practical elements in a major piece of independent work. The project is industrially relevant to ensure maximum benefit to the student. Distance learning students will complete the project in their workplace. Students undertaking the project are expected to draw on knowledge and experiences gained from studying the taught material and apply it to the industrial context.

The underlying philosophy of the project is that of allowing each student to develop educationally as an

individual by studying, analysing and evaluating in depth some problem or area relevant to applied instrumentation and control. The project offers an alternative to learning within the traditional lecture/tutorial environment and consequently an alternative method for the student to demonstrate his/her capabilities.

The student will be supported throughout the project by an academic supervisor. For those full time students who go on placement, an industrial mentor (who will be responsible for the student while on placement) will also be assigned. For distance learning students, who will normally carry out their project in their workplace, this function is likely to be fulfilled by the students line manager.

As part of the project assessment, students are required to give an electronic presentation (e.g. PowerPoint®). This element of assessment aims to assess the students' ability to communicate effectively both in written and oral form. Distance learning students will submit an electronic presentation and participate in a question and answer session with two members of academic staff via a conference call. Assessment of the project is based on the student's practical ability, an oral presentation and project reports. Guidance for all aspects of the project including the assessment is provided in the Project Handbook.

Strategy for Learning (SfL)

The SfL for the MSc Applied Instrumentation & Control programme is fundamental to achieving the overall aims of the programme. The teaching approach is student centred, practical and participative and has been designed to move away from the traditional teacher centred paradigm to a more active, student driven, personalised engaged model of learning using state of the art technologies necessary for employability in a digital age.

Students are encouraged to take a broad view of their education and contextualise course materials to their personal objectives and the real world. A range of delivery methods are used on the programme including: lectures; group-based tutorials, group based practical exercises; problem based learning scenarios and case studies; directed study; coursework assignments (individual and group-based) and supervised projects. Online digital support media allows students to utilise alternative learning materials suitable to their personal learning style.

GCU's SfL is underpinned by a model comprised of eight design principles. This programme embeds these principles in the following ways.

Engaged learning:

- Examples include opportunities for learning which are project-based. Depending on the interests and experience of the individual, these may be work-based and co-designed. Individual practical laboratory work allows for personalised learning, while group-based learning features in modules such as system health management.
- Recognizing and building on the range of skills, knowledge and strengths gained through work-based and other experiences which students bring to the curriculum. Our FT cohort can range from new graduates to highly experienced professionals who are aiming to enhance their formal qualification level. The mix provides opportunities for informal mentoring activity but the programme team will also invite these experienced students to share their knowledge in a more structured setting.
- The Learning Development Centre, Careers Service and Library provide sessions on topics such as CV preparation, preparation for interview and psychometric assessment, as well as others that involve preparation for examination, exam and study skills.
- Other opportunities for engagement include Student Staff Consultative Group meetings, Programme Board membership (for student representatives).

Divergent thinking

- Laboratory based coursework provides the opportunity for students to engage with open ended problems and projects both individually and in teams.

Flexible, Inclusive and Accessible Learning

- Flexibility into and through programmes with opportunities for RPL, WBL, distance and online learning.

- There is space within the curriculum for opportunities for personal and professional development, such as learning outside the programme, for example LabVIEW certification, language development transition to WBL via DL registration.
- The School has experience of developing and delivering programmes to a wide range of students. Based on identified needs, specific staff development, adaptation of resources and the development of learning and teaching approaches is continually taking place to ensure access to the curriculum is maximised. In particular expertise and resources are in place to provide access to and support for students with a range of disabilities. The programme team fully supports the University's vision for Equality and Diversity and is fully committed to supporting "A culture and environment which is inclusive of all sections of society and responsive to the needs of individuals. Resulting in staff, students and other stakeholders who are free from any form of discrimination in respect of all their dealings with Glasgow Caledonian University, enabling them to participate fully in all aspects of University life and make a valuable contribution to the success of the institution."
- The programme team is committed to the principles of promoting equality of opportunity through eliminating discrimination and disadvantage, and recognising the benefits of diversity. The Programme Board for the programme ensures that all potential and current staff, students and other stakeholders are treated fairly, and are not discriminated against on grounds of sex, marital status, gender reassignment, racial group, disability, sexual orientation, religion or belief, age, socio-economic background, trade union membership, family circumstances, or any other irrelevant distinction. The Programme Board will strive to create an inclusive and supportive environment for all students that values diversity and promotes equality.

Broad and Deep Learning

- Students are encouraged to attend specialist lectures/talks given by industry representatives. These lectures offer students the opportunity to increase their awareness of the broader context of their discipline and interact with industrial speakers. Th opportunities for this have increased recently with the widespread use of online seminars which can reach a wider, and more distant, audience.
- A variety of assessment methods are used within the modules, depending on the aims, objectives and the learning outcomes of the module. For example, some of the modules are more theoretical in nature and others are more practical or software based, while others are more discursive or presentation based. These therefore require different teaching and, learning and assessment approaches. The most common instruments of assessments used are unseen examinations and coursework assessment exercises of various types.

Global Learning

- Historically, and for the foreseeable future, the programme has recruited in the main from overseas. It has, therefore, a cohort comprising students from a range of national origins many of whom will come with relevant prior industrial experience. Students develop global perspectives both cross-culturally and professionally by this interaction.

Flexible Learning

- Applicants may be eligible for admission under the GCU Recognition for Prior Learning (RPL) Policy. Credit Transfer or Recognition for Prior Informal Learning (RPiL) can be applied for by any student. Consideration of pre-admission claims for RPL from potential students is coordinated centrally by the Student Recruitment and Admissions Service (SRAS) and will normally involve consultation with the programme leader or Associate Dean for Learning Teaching and Quality.

Real word problem solving

- The programme is represented on the Department of Engineering Industrial Advisory Board. This Board brings together academic staff with selected individuals from local industry including BAE Systems, Babcock International, Clyde Bergemann, Howden Compressors, Main Tool, NCE Switchgear, Rolls Royce, Scottish Power, with the aim of ensuring that the programme is meeting the needs of industry and that the industry is aware of research and programme development within Department.

- The curriculum is designed to meet the demands of future and current global difficulties such as the need to overcome global warming by providing a platform for Control & instrumentation engineers with the skills and attributes necessary for solving those difficulties. Graduates from this programme will be the next generation of engineers involved in many aspects of industry that have energy generation, transportation, instrumentation and communications at the forefront of their expertise.

Entrepreneurship

A theme which runs through many of the modules is a professional orientation which encourages the consideration of ethical working practices and the design of products for sustainable development.

- Students are encouraged to join the Institute of Measurement and Control, which accredits this programme, as student members. They are also encouraged to attend events organised by this and other bodies which provide an opportunity to develop their knowledge of the application of engineering principles, observe “real world” problems being solved, and network with fellow students and professional engineers alike.

Responsible leadership and professionalism

- The MSc Applied Instrumentation and Control is fully professionally accredited as meeting the educational requirements for Chartered Engineer recognition.
- A strong theme running through the programme is that of systems health management which is an essential ingredient of a future relying upon clean, efficient and sustainable technology.

Common Good Attributes

The School recognises that for the 21st century, graduates are more and more required to demonstrate global citizenship and be equipped with the necessary skills, confidence and experience to achieve life ambitions.

The Common Good Attributes are:

- Active & Global Citizenship
- Entrepreneurial Mind-set
- Responsible Leadership
- Confidence

In addition to the University initiatives to embed these attributes in the students University experience the programme develops all of the above characteristics with the professional and creative approach to study. Staff are aware of the importance of professionalism and exhibit this at every opportunity within the learning experience at module level. The common good attributes are embedded into the curriculum together with the professionalism shown by all staff involved in programme delivery.

4. PROGRAMME STRUCTURES AND REQUIREMENTS, LEVELS, MODULES, CREDITS AND AWARDS

The proposed programme consists of 8 taught modules and an industrially relevant project. Each module is credited with 15 credits and the final project is credited with 60 credits. In accordance with the University guidelines, the following exit awards are available:

Postgraduate Certificate	60 credits
Postgraduate Diploma	120 credits
Master of Science	180 credits

Hence a student completing the 8 modules and accumulating 120 credits would be eligible for the award of a Postgraduate Diploma in Applied Instrumentation and Control. On successful completion of the 8 modules, and the project, the student would be awarded the MSc in Applied Instrumentation and Control. A student accumulating 60 taught credits would be eligible for the award of Postgraduate Certificate (un-named).

The Programme Structure is as follows:

SCQF Level 11		
Module Code	Module Title	Credit
MMH126808	Data Capture	15
MMH626878	Measurement Systems	15
MMH626812	System Health Management	15
MMH626814	Signal Conditioning and Analysis	15
MMH626825	Control Systems 1	15
MMH626809	Control Systems 2	15
MMH626810	Model Predictive Control	15
MMH323674	Professional Practice	15
Exit Award – PgD in Applied Instrumentation and Control		120
MMH621937	project	60
Exit Award – MSc in Applied Instrumentation and Control		180

5. SUPPORT FOR STUDENTS AND THEIR LEARNING

Induction programme

The students registering on the programme will have access from the outset to a wide range of facilities and services designed to support both the students and their learning throughout the programme. For full time students this will be achieved through a formal induction programme which will include:

- An induction pack comprising the Programme Handbook, module descriptors and assessment schedules.
- Introduction to the aims of the programme; its structure; its contents and modes of assessment.
- Introduction to the University, its services, and the library including the on-line catalogue system.
- Accessing the C&IT services, including GCUlearn® and Webmail.
- Accessing learning services.
- Introduction to Personal Development Planning.

Distance learning students will be sent a comprehensive induction pack covering all the above items

and will receive a 'get to know you' telephone call from the programme leader at the start of the programme.

During the induction period full-time students will:

- meet with members of the Programme Team;
- be assigned a personal tutors/PDP advisor.

During the induction period full time students are provided with information on, and will undertake specific sessions on, information retrieval skills, literature search, etc. They will also be introduced to the Caledonian Library and Information Centre which has an extensive range of resources and provides access to other local and national library resources. Students are given details of the range of support and guidance offered by the Student Services Department and are taken on a tour of the campus.

Delivery of the induction programme to Part time students at CENU will be the responsibility of the CENU Programme Manager and will typically involve:

- Welcome Address from Programme Manager (GCU/CE, NU)
- Expectations of Students/Staff
- An introduction to the college, its services, and the library including the computerised catalogue system
- Introduction to GCU Learn
- Accessing College IT Services
- The Role of the College's Student Support Services, including Careers Guidance.
- Plagiarism Issues
- Introduction to Programme Handbook
- The Nature of the Dissertation/Project

IT support

The University, through C&IT services provides student support through the online student hub, student e-mail facilities, and open access to a range of University IT facilities. Students are encouraged to make full use of the Saltire Centre, the Learning Café as well as the Student Association's facilities..

The School of Computing, Engineering and Built Environment has invested in a number of computer laboratories with internet access which are available on an open access basis, when scheduled teaching is not taking place in them. GCUlearn, a managed learning environment is used for programme and module support.

Specific to this programme, a computer controlled measurement facility with a range of industry standard hardware and software relating to applied instrumentation and control will be available to the students. In addition, student install licences are available for some important applications which will allow students to use GCU software on their own machines. It is also possible to use VPN facilities to access machines running specialist software on campus.

For distance learning students relevant software will be provided for them to use off campus. These students will also be provided with a USB signal interfacing/data acquisition device and will have access to various instruments at GCU over the internet for data acquisition and/or control.

Part time CENU students will have support provided through the CE, NU Student Portal, student e-mail facilities, and open access to a range of College IT facilities. They will also be able to access GCUlearn and e-library.

Academic support

Module leaders, module tutors and their contact details are detailed in the individual module handbooks. Teaching staff, including the Programme leader, operate a policy of open access for consultation and help, and in addition can be contacted through email, fax or telephone. Distance learning students will be contacted by the module leader at the start of each module and module tutors will be available via email or telephone to support students throughout each module.

In addition to offering technical advice, academic staff may advise students on areas such as time management, and study skills. On-going support in English may be offered for students for whom English is not their first language. Academic staff may also refer students to a range of University student support services such as the Learning Development Centre or Student Counselling.

The CENU Programme Manager will be the first point of contact for Part time students will and provide the majority of academic guidance. The CE, NU Programme Manager, will be supported by the GCU Programme manager in this respect and students will also be able to contact the GCU Module Leader while teaching at CE, NU or via e-mail/GCULearn.

The MSc project is a substantial piece of independent work. The students are supported in this work through the allocation of an academic supervisor. The programme also has a named academic who acts as the Project coordinator and who provides overall guidance. A Project handbook details the requirements of the project and provides information on all aspects including the preparation of the project report.

Personal Development Planning (PDP)

Students will be supported throughout the programme by a PDP advisor who will advise on the PDP process and support the students in developing effective techniques for reviewing their progress.

A key element in the PDP process is to foster the employability of graduates. Students will be encouraged to make use of the University Careers Guidance service and other mechanisms in order to develop an awareness of the industry and identify career opportunities. Students will also be encouraged to attend research seminars and Institute of Measurement and Control local branch meetings.

Distance learning students are already employed in a relevant industry and will normally be undertaking the programme as part of their continued professional development. The PDP process will help them to focus on their objectives and to ensure that they gain maximum benefit from the programme.

Trimester Week	Activity
3-14	Trimester 1 teaching programme
3	First Personal Development Planning (PDP) Meeting (including setting of initial goals). (Discussion will focus on for example CV preparation, identification of industrial sector of interest to student)
18-19	Trimester 1 examination period
21-32	Trimester 2 teaching programme
17	Second PDP Meeting (Review of initial goals and definition of further goals) (Discussion regarding industrial placement, employment opportunities, progress with applications etc)
34-36	Trimester 2 examination period
30	Third PDP Meeting (Review of goals from second meeting and definition of further goals)
31 to 42	Student Project
43	Final PDP Meeting

Table 3 Integrated PDP Programme for Full Time Student Support

Distance learning students will be contacted via telephone by the PDP advisor at the start of the programme then periodically throughout the period of study to review and define further goals.

Student Feedback Mechanisms

Students will have a number of formal feedback mechanisms which include module evaluation forms completed by each student for each module, student representation on the Programme Board, and a Student Staff Consultative Group held each semester. Distance learning students will be invited to send comments to the clerk prior to the meeting and will be provided with a copy of the minutes of the meeting.

6. CRITERIA FOR ADMISSION

Candidates must be able to satisfy the general admissions requirements of Glasgow Caledonian University

Programme Admission Requirements:

The criteria for admission conforms to the University's Admissions Policy.

International students whose first language is not English shall normally be required to demonstrate evidence of satisfactory competence by holding one of the following qualifications:

- IELTS test with a score of 6.0.
- TOEFL with a minimum score of 550.
- Computer based test in English as a Foreign Language (TOEFL) with a minimum score of 213.

Candidates for the programme will normally be at least 21 years of age at the start of the programme, and should have one of the following:

- Honours Degree of a UK University or equivalent in a science or engineering subject.
- Graduate Diploma of a UK University in a science or engineering subject.
- An equivalent qualification from an acceptable overseas institution.

In addition, part-time and distance learning students are required to be working in an area related to applied instrumentation and control.

Flexible Entry - Credit Transfer and RPL:

Candidates who do not fall into the above category may still be admitted to the programme if they can satisfy the Programme Board of a sufficient level of expertise. The University's guidelines for Recognition of Prior Learning (RPL), May 2011 may be used to assess a candidate's claim.

Entry with Advanced Standing

Candidates may be granted entry with advanced standing, if they can demonstrate equivalence to the learning outcomes of a module. This is covered by the statement on RPL above.

Glasgow Caledonian University leads the way in widening access to higher education. As part of the University's mission to promote the common good, we work with schools, children and families in the

local community to raise educational aspirations in young people and their families. The Contextualised Admissions Policy aims to build on this work and recognise the different student learner journeys. The policy aims to recognise and acknowledge that not all applicants have an equal opportunity to demonstrate their full academic potential and will take into consideration the context and circumstance in which a student has achieved his/her academic grades. For details please access the policy here: <https://www.gcu.ac.uk/aes/documentsandpolicies/>

7. METHODS FOR EVALUATING AND IMPROVING THE QUALITY AND STANDARDS OF TEACHING AND LEARNING

Mechanisms for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:

- Annual Programme Monitoring Process
- Annual Module Monitoring Process
- Module Feedback Questionnaire
- External Examiner(s) Reports
- Annual monitoring (required by Professional and/or Statutory Bodies)
- Enhancement-led Internal Subject Review (ELISR)
- Enhancement-led Institutional Review (ELIR)

Committees with responsibility for monitoring and evaluating quality and standards:

- Student-Staff Consultative Group (SSCG)
- Programme Board (PB)
- School Board
- Assessment Board (AB)
- University Learning and Teaching Sub-Committee (LTSC)
- University Academic Policy and Practice Committee (APPC)
- University Senate

Mechanisms for gaining student feedback on the quality of teaching and their learning experience:

- Student-Staff Consultative Group (SSCG)
- Student representation on Programme Board (PB)
- Student representation on School Board
- Module Feedback Questionnaire
- GCULearn
- Open access to members of Programme Team e.g. Module Leaders, Programme Leader, Academic Advisor, Year Tutor

Staff development priorities include:

- Postgraduate Certificate in Academic Practice
- Continuous Professional Development (CPD)
- Performance and Development Annual Review (PDAR)
- Peer support for teaching
- Mentoring scheme for new teaching staff
- Conference and seminar attendance and presentation
- Research Excellence Framework (REF) submission
- Membership of Higher Education Academy (HEA)
- Membership of and involvement with Professional Bodies

Insert as appropriate

8. ASSESSMENT REGULATIONS

Students should expect to complete their programme of study under the Regulations that were in place at the commencement of their studies on that programme, unless proposed changes to University Regulations are advantageous to students.

The Glasgow Caledonian University Assessment Regulations which apply to this programme, dependent on year of entry can be found at:

[GCU Assessment Regulations](#)

or

The Glasgow Caledonian University Assessment Regulations which apply to this programme, dependent on the year of entry and with the following approved exceptions can be found at :

[GCU Assessment Regulations](#)

9. INDICATORS OF QUALITY AND STANDARDS

The University has an established mechanism for evaluating and improving the quality and standards of teaching and learning. These are contained in the Handbook for Continuous Quality Improvement and it is the intention of the programme team that all of these mechanisms will be adopted.

INTERNAL INDICATORS

University Internal Audit
Annual Programming Analysis
Annual Module monitoring
Internal subject review

EXTERNAL INDICATORS

External Examiners report
Professional Body involvement - Institute of Measurement and Control
Industrial Advisory Board

10. INFORMATION ABOUT THE PROGRAMME

Key information about the programme can be found in:

- Definitive Programme Document
- Programme Handbook
- Module Handbook

- University Website <http://www.gcu.ac.uk>
- School Website
- GCULearn
- My Caledonian
- University Prospectus
- *Insert other relevant School/Programme Information not highlighted above*

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning assessment methods of each module can be found in the University Module catalogue which can be accessed from the University website. The accuracy of the information in this document is reviewed by the University and may be checked by the Quality Assurance Agency for Higher Education.

A curriculum map is attached showing how the outcomes are being developed and assessed within the programme. This relates the modules from Section 4 to the outcomes in Section 3.

DATE:

Curriculum Map for MSc Applied Instrumentation and Control

The curriculum map links the modules (Section 4) to the Outcomes listed in Section 3

PSMAP

This map provides both a design aid to help academic staff identify where the programme outcomes are being developed and assessed within the course. It also provides a checklist for quality assurance purposes and could be used in approval, accreditation and external examining processes. This also helps students monitor their own learning, and their personal and professional development as the course progresses. The map shows only the main measurable learning outcomes which are assessed. There are additional learning outcomes (e.g. attitudes and behaviour) detailed in the module specifications which are developed but do not lend themselves to direct measurement

Modules

Programme outcomes

	Code	Title	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3	D4	E1	E2	E3	E4
SCQF11	MMH126808	Data Capture	✓	✓	✓		✓			✓	✓	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	MMH626878	Measurement Systems							✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	MMH626812	System Health Management			✓	✓	✓	✓	✓		✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
	MMH626814	Signal Conditioning and Analysis	✓	✓	✓	✓	✓				✓	✓	✓	✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	
	MMH626825	Control Systems 1	✓	✓	✓	✓					✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	
	MMH626809	Control Systems 2	✓	✓	✓	✓				✓	✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	
	MMH626810	Model Predictive Control	✓	✓	✓	✓				✓	✓	✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	
	MMH323674	Professional Practice			✓			✓	✓		✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	MMH621937	project						✓	✓						✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	

A1	the facts, concepts and application of mathematics to instrumentation and control.	C1	take account of technological, ethical and commercial constraints in achieving engineering solutions.
A2	the facts, concepts, principles, theories and application of science relevant to applied instrumentation and control.	C2	develop, monitor and update a plan, to reflect a changing operating environment
A3	the facts, concepts, and application of technology relevant to applied instrumentation and control.	C3	undertake practical testing of design ideas, either in the laboratory or through simulation, with technical analysis and critical evaluation of results.
A4	the concepts, and principles of design relevant to applied instrumentation and control.	C4	develop, promote and apply safe and ethical systems of work.
A5	the facts, concepts, and application of IT relevant to applied instrumentation and control.	C5	Think critically and solve problems.
A6	the concepts and application of project management principles relevant to applied instrumentation and control.	D1	Information retrieval skills.
A7	the facts, concepts and application of safety and ethics relevant to the development of instrumentation and control solutions.	D2	IT Skills.
A8	the concepts and application of quality assurance principles relevant to applied instrumentation and control.	D3	Communication skills, written, oral and listening.
B1	solve complex problems related to instrumentation and control.	D4	Numeracy skills.
B2	obtain, analyse, and interpret data from complex systems and processes.	E1	Time management (organising and planning work).
B3	critically evaluate complex systems and processes.	E2	Independent working.
B4	design components, complex systems and processes.	E3	Planning, monitoring, reviewing and evaluating own learning and development.
B5	undertake research in the area of applied instrumentation and control.	E4	Operate effectively within a group to achieve an effective engineering solution.

ASSESSMENT LOADING MATRIX

SCQF Level 11									
Module Code	Module Title	Trimester	Credits	Assessment Weighting					
				Cw1	Cw2	Cw3	Exam1 (Exams Office)	Ex2 (Exams Office)	Ex3 (Class Test)
MMH126808	Data Capture	A	15	50			50		
MMH626878	Measurement Systems	A	15	50	50				
MMH626812	System Health Management	A	15	70	30				
MMH626814	Signal Conditioning and Analysis	A	15	50					50
MMH626825	Control Systems 1	B	15	30			70		
MMH626809	Control Systems 2	B	15	30					70
MMH626810	Model Predictive Control	B	15	100					
MMH323674	Professional Practice	B	15	50	50				
MMH621937	project	C	60	20	20	60			
EXIT AWARD: MSc in Applied Instrumentation and Control									

MSc Applied Instrumentation and Control - Assessment Schedule: Trimester A

	Data Capture	Sig Cond & Analysis	Sys Health Man	Meas Systems
1				
2				
3				
4				
5				
6				Cw1 (50%)
7				
8		Class Test (50%)		
9				
10	Cw (50%)			
11			Cw1(design analysis 70%)	
12		Report (50%)	Cw2 (report 30%)	Cw2(50%)
	Examination (50%)			

MSc Applied Instrumentation and Control - Assessment Schedule: Trimester B

	Control Systems 1	Control Systems 2	Model Predictive Control	Professional Practice
1				
2				
3				
4	Cw1 (30%)			
5				
6				Cw1 presentation (50%)
7				
8		Cw1(50%) cw2(50%)		
9				
10				
11				
12			Cw (100%)	Cw2 report (50%)
	Examination (70%)			