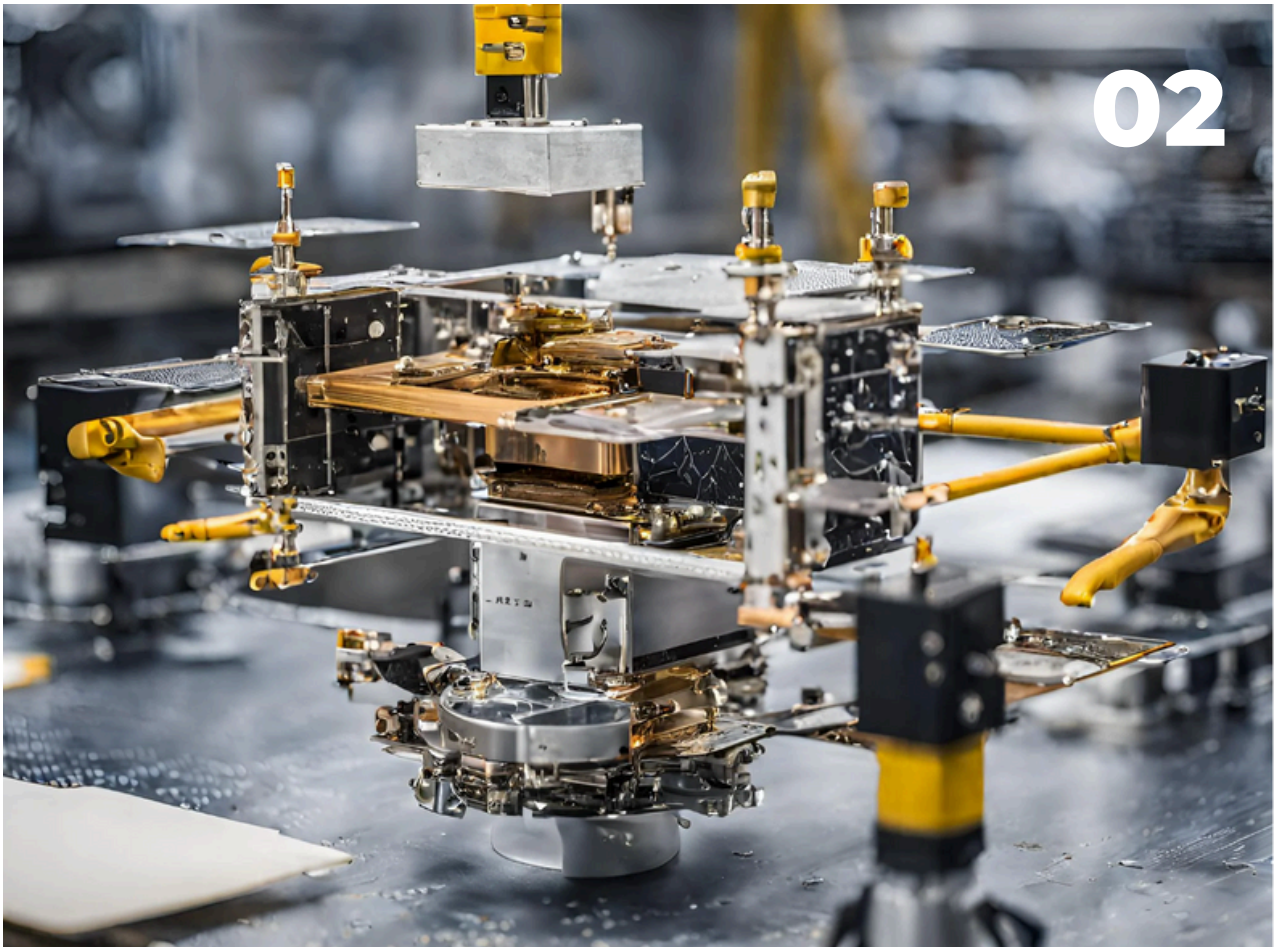
DISCOVERY PAPER

UKSA CLUSTER DEVELOPMENT PROJECT

This report captures the conclusions drawn by the project team through engagement with this project.

CITY OF GLASGOW COLLEGE

Fife College

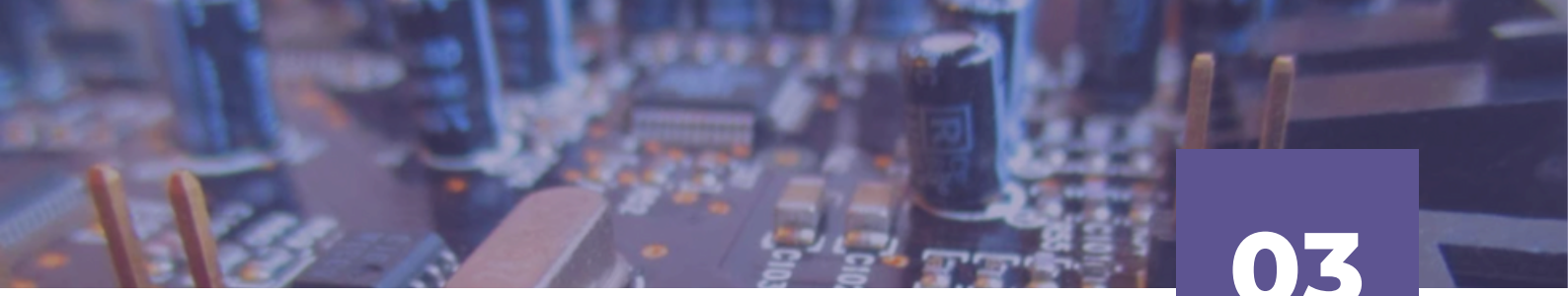


ABOUT OUR PROJECT

UKSA Cluster Funding will help develop the cluster activity in Scotland, focussing on: Sustainable Space, Workforce Development and Knowledge Exchange and Cross Sectoral Diversification.

WP2 Workforce Development will execute short-term and long-term measures to deliver a comprehensive uplift and critical skills for the continuous growth of the Scottish Space Cluster and the broader industry. WP2.1 is being delivered City of Glasgow College and Fife College.

Due to unforeseen circumstances, a change of partner was required in April 2024, with Perth College, UHI, and Air Service Training leaving the project. Fife College kindly accepted CoGC's offer to join the project in their place.



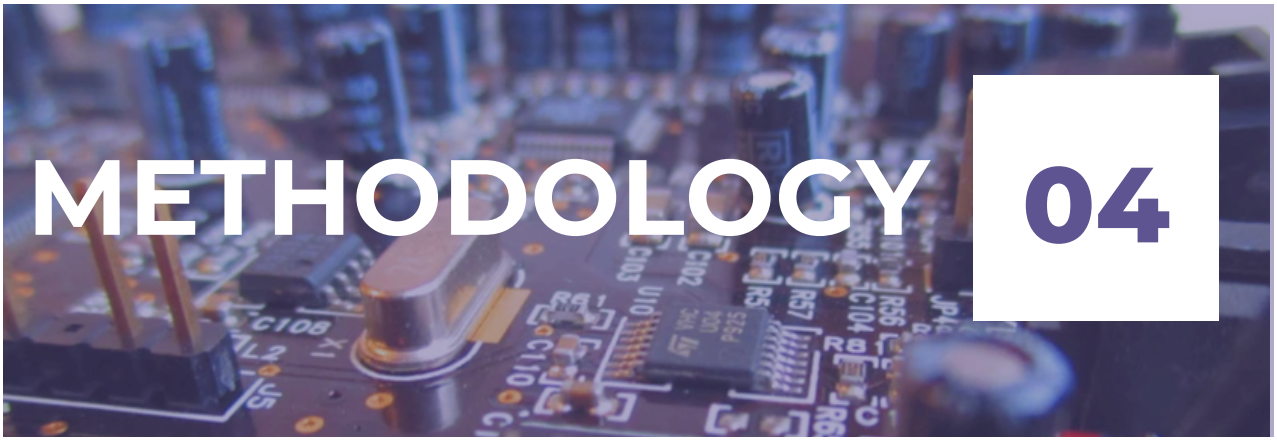
03

CITY OF GLASGOW COLLEGE

City of Glasgow College is one of Scotland's largest technological, vocational and professional skills colleges. Up to 8,000 graduates leave the college each year from our world-class, twin-site super campus in the heart of Glasgow, which offers outstanding resources and opportunities for students to gain essential skills for their future careers.

FIFE COLLEGE

Fife College's talented and experienced team is dedicated to transforming the lives of our 6,000 full-time and 14,000 part-time students through education and training. We offer a wide range of inspirational learning experiences from essential skills to graduate degree programmes.



METHODOLOGY 04

Review of Skills

Our approach began with a review of various skills survey reports from the UK Space Agency and SmartSat CRC Ltd. These reports provided a background to the Space sector segments, as well as perceived scientific, engineering and technical skills gaps that exist, alongside some of the current responses to these gaps.

Industry Visits

Our team carried out a number of visits to Space organisations, predominantly across Glasgow City Region. Visits to e.g., AAC Clydespace and Alba Orbital provided firsthand engagement with companies to understand specific skills gaps they are experiencing and provided an opportunity to identify the current training programmes/initiatives in place and in which areas or disciplines.

Industry Validation

After establishing the syllabus for each of the three micro-credentials, we conducted industry engagement in the form of an online workshop and follow-on survey to ask industry partners to validate our curriculum proposals.

FINDINGS

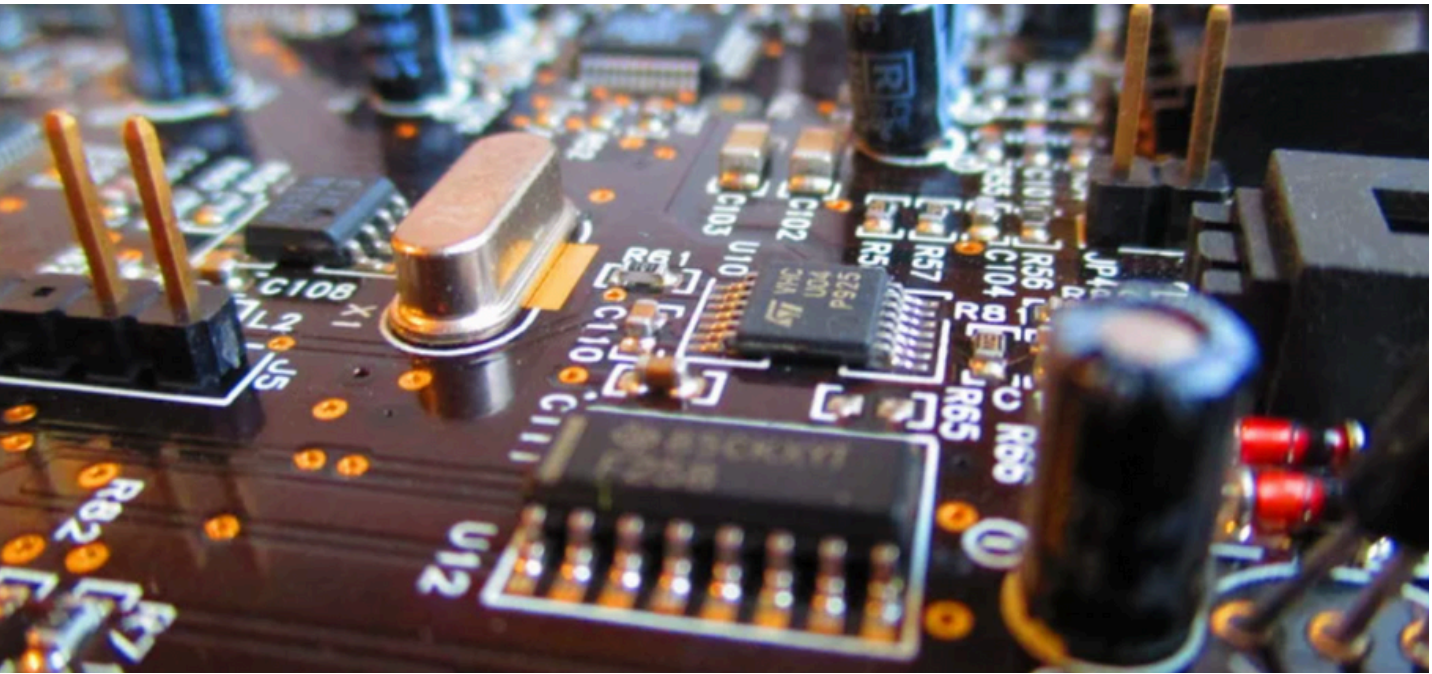
05

Recruitment and Talent Retention Challenges

- Companies face challenges in recruiting locally, with most recruits being international.
- There's a particular struggle in filling positions related to attitude orbit control, which is a global challenge within the industry.
- Low training budgets and difficulty in identifying skill gaps suggest a need for a more structured approach to training and development.
- Despite internal training initiatives, there's still a reliance on consultants due to under-resourcing and difficulty in recruiting experienced staff.

Skills Development and Training

- Skills matrices would be beneficial in identifying skill gaps and prioritising training needs across technical and soft skills.
- Some companies acknowledge the importance of management and commercial skills, especially for team lead roles, alongside technical skills.
- Collaboration with educational institutions e.g., Glasgow Caledonian University, Strathclyde University, and Ayrshire College are the current opportunities for skills development, particularly in software, electronic, and mechatronics engineering.



FINDINGS

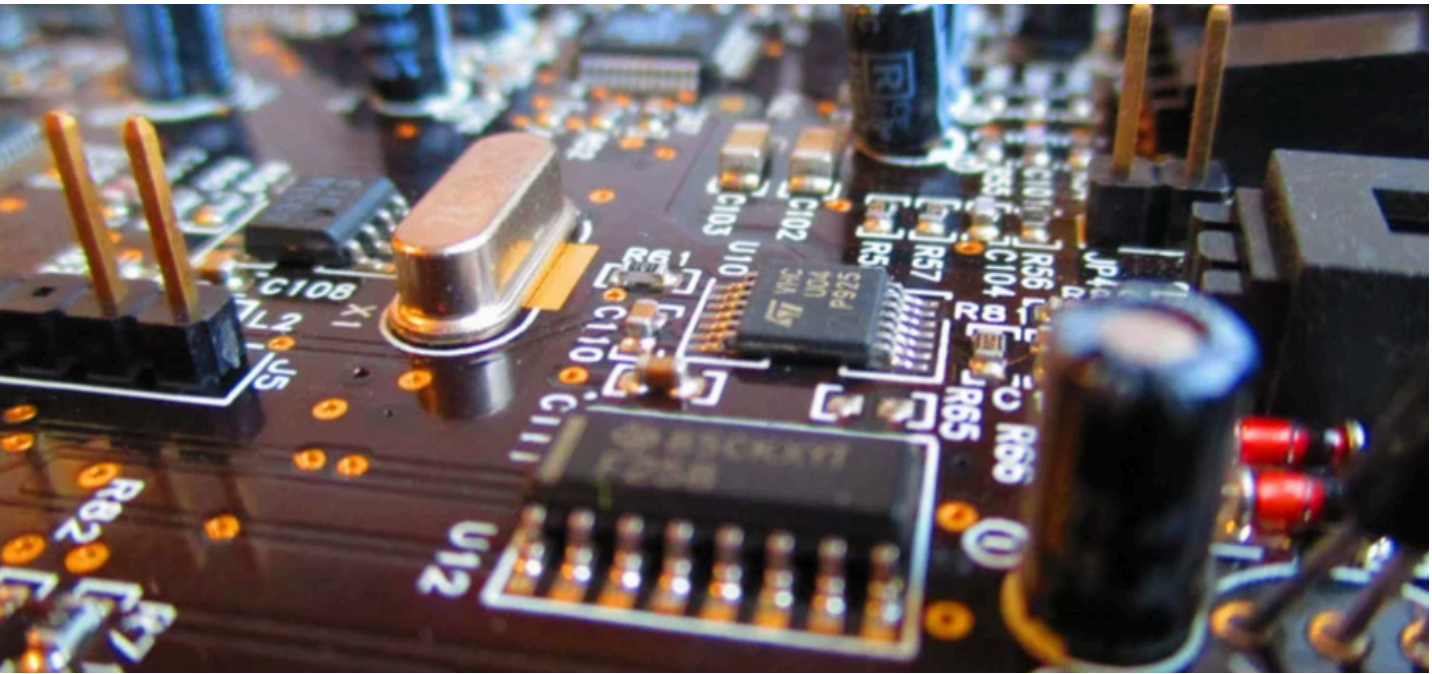
06

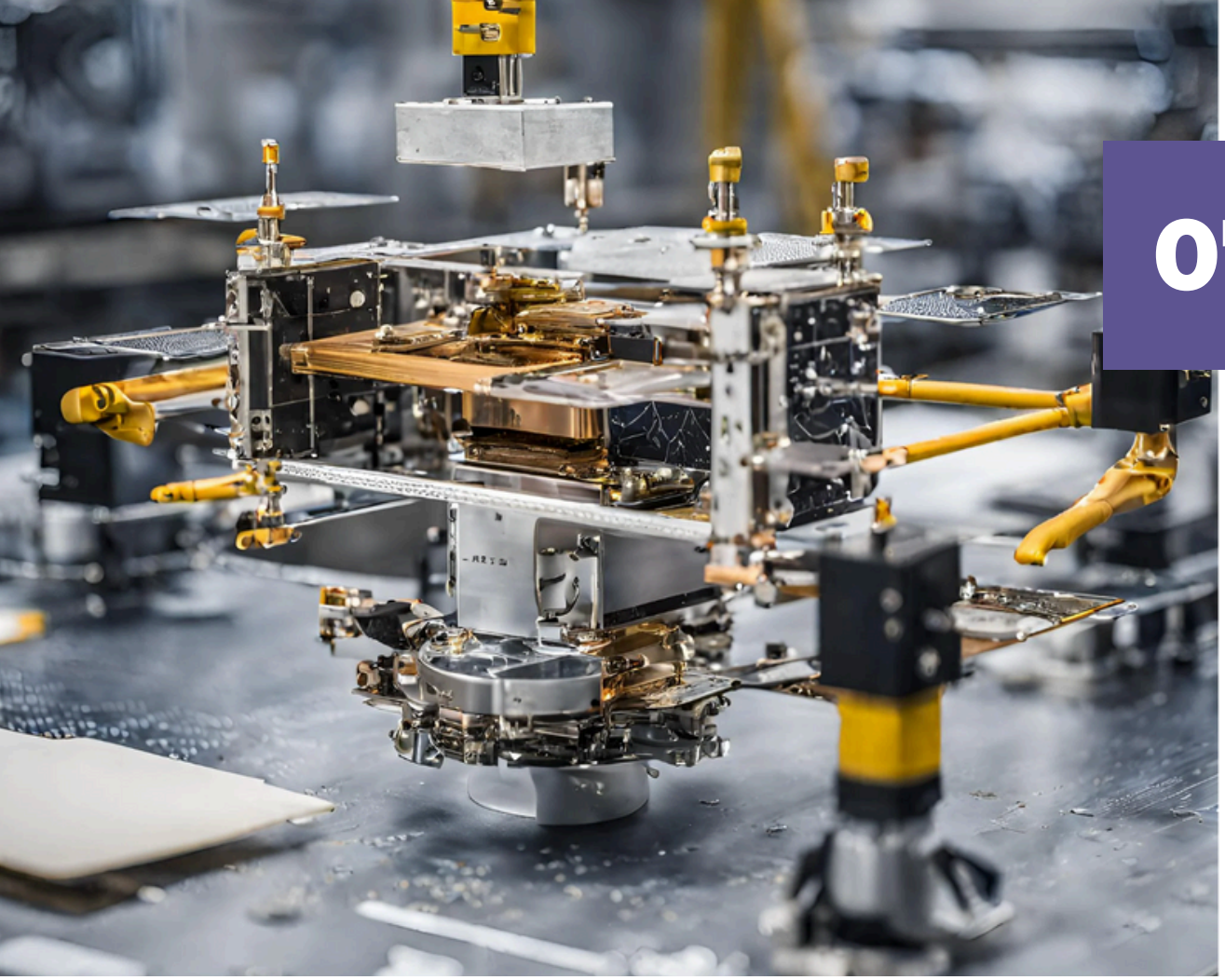
Industry Adaptation and Innovation

- Companies recognise the need to stay updated on technological advancements.
- Despite the slow pace of industry change, there's a focus on product enhancement and innovation, particularly in RF optics and satellite manufacturing.
- Companies value a "can do" attitude and seek individuals willing to engage and adapt to a rapidly evolving technological landscape.

Diversity and Inclusion Efforts

- Some companies face challenges in attracting female applicants, with females representing only 1-2% of applicants.
- Efforts should be made to promote diversity and inclusion, particularly in roles like welding and technician positions, and where there's a lack of gender representation.
- Building partnerships with educational institutions and promoting a generic interest in space at school level would help attract a more diverse talent pool.





07

OVERVIEW

We have designed 3 micro-credential programmes that will address current recruitment strains on Scotland's Space Sector and build a more diverse space workforce.

The 3 micro-credentials available, cover:

- **Space Science and the Space Sector**
- **Sustainable Satellite Manufacturing**
- **Electronics and Eco-design**

SYLLABUS

08

We have developed two learner personas to cover a breadth of learners who could undertake our programmes. The first covers an employee looking to transition into the space sector, who is not in an engineering or design role. The second covers an Electrical Engineering graduate looking for industry experience in the sector.

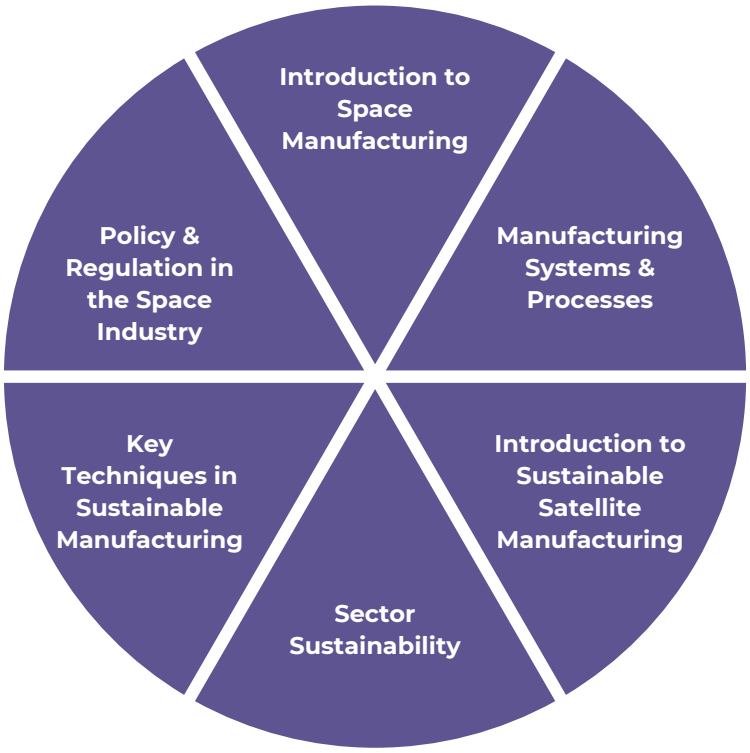
Space Science & Sector

This course will assist participants to describe the space sector in broad terms, including orbits and the space environment. It will also enable participants to describe the main sub systems of a satellite and common models of how space projects are managed.

- Welcome to the Space Sector
- Our Space Enabled Future
- Space Architectures
- Orbits in Plain English
- Launch Vehicles
- From Launch to Orbit
- Spacecraft Environments
- Spacecraft and Subsystems
- Managing the Space Project
- Case Study: Earth Observation

SYLLABUS

09



Satellite Manufacturing Sustainable

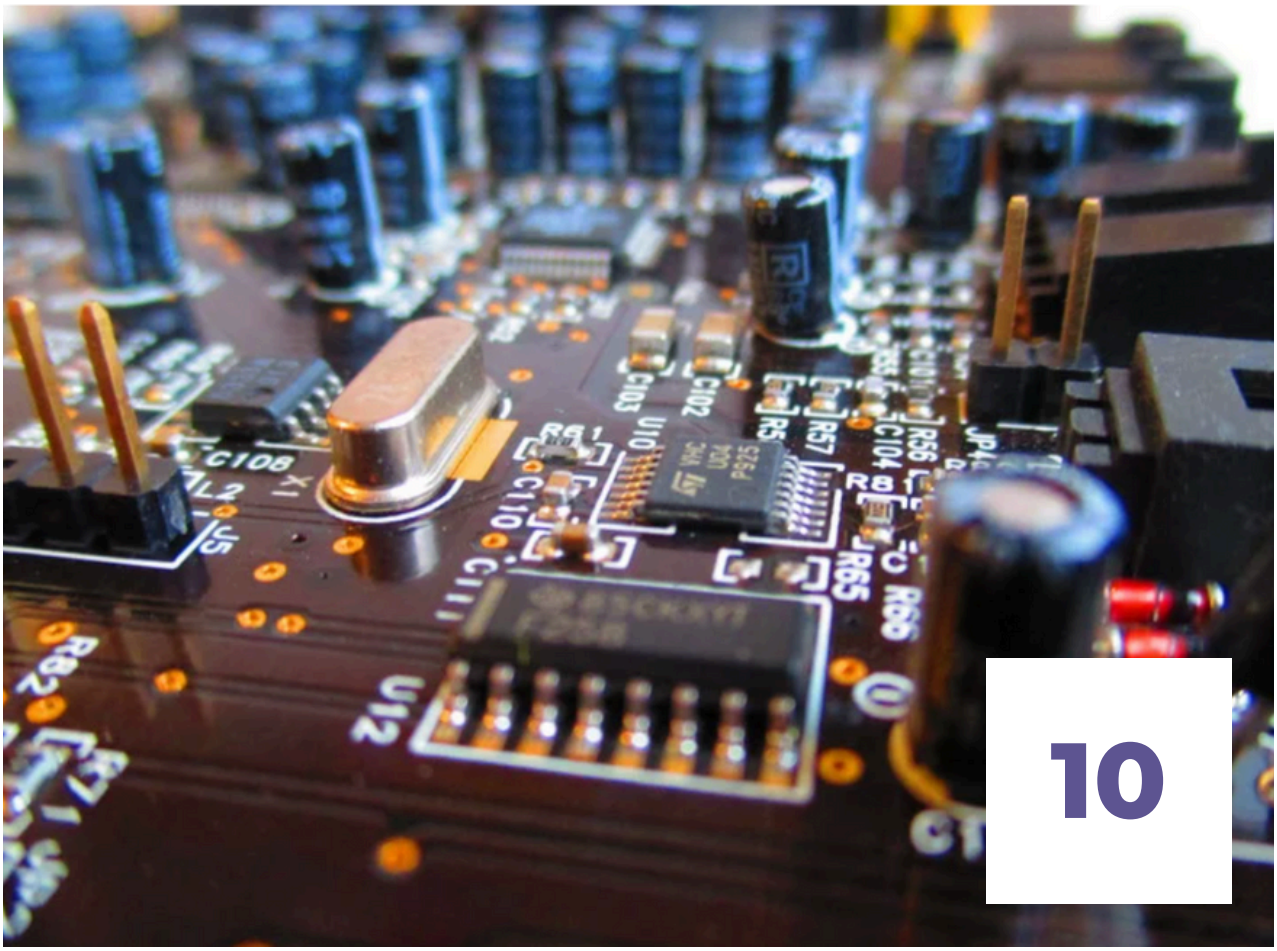
This course will enable participants to understand the environmental and social impacts of the satellite manufacturing industry, and how to apply sustainable design principles and manufacturing practices to satellite manufacturing.

Electronic & Ecodesign

This course will help participants to understand typical satellite electronics system structures and gain an awareness of the environmental effects on electronic systems

.

- Introduction to Vehicle Systems
- CubeSat Communications
- Common COTS Interfaces
- Challenges for Electronics in Space
- Responsible Satellite Design



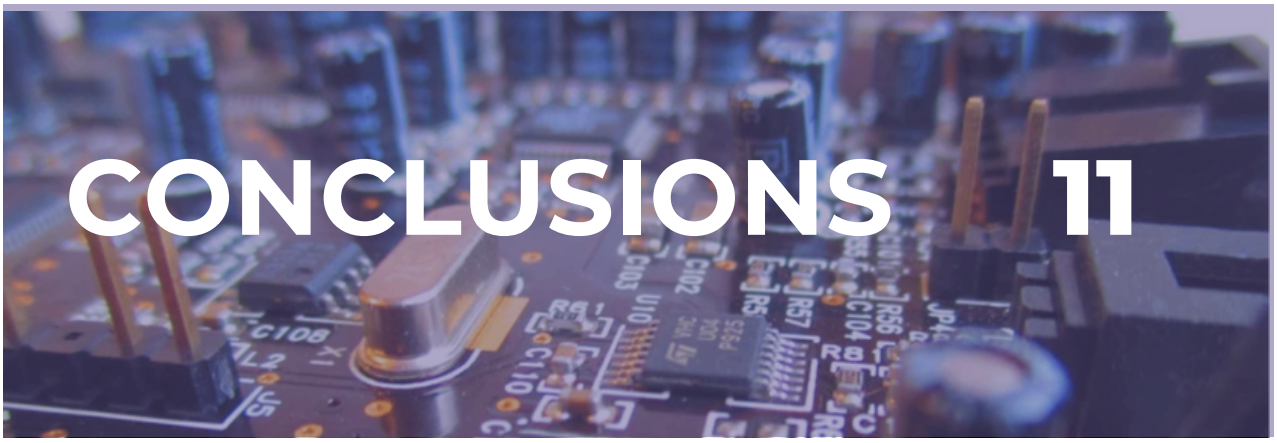
10

DELIVERY MODEL

The team utilised the ABC learning design model, which is a pedagogical framework used in designing and delivering effective learning experiences. The model encourages the incorporation of a range of learning activities to cater to different learning preferences and needs, which is predominantly facilitated through the integration of technology, allowing us to leverage digital tools and resources.

We have built our courses on the popular learning management system (LMS) Moodle, which is an open-source platform offering several benefits for both our educators and learners.

Our courses are 100% Online (via our VLE) and offer asynchronous learning opportunities, with Multiple Choice Questions (MCQ's) being used to validate learning. A Digital Badge being offered to participants on completion, whilst we look to formally accredit these courses.



CONCLUSIONS 11

Widening the Talent Pool

With more opportunities being created across the sector, Scotland's dynamic and growing space sector presents a number of high-tech and high skill jobs. Widening access to the sector through various pathways will help attract a more diverse talent pool, particularly in technician positions.

Aligning Skills Provision

With a vibrant education community, Scotland is well placed to foster innovation and collaboration to create a coherent skills proposition which serves the sector. New partnerships between schools, colleges and universities can create a talent pool that can meet the increasing demand for skills and talent, in both upstream and downstream activity.

Increasing Industry Attractiveness

With other key sectors in Glasgow City Region and Scotland also competing for talent, sector attractiveness among the existing workforce and new talent will become a key mechanism in inspiring the next generation of space industry workers. The sector needs to raise awareness of the wide range of opportunities, from satellite and rocket manufacturing to launch facilities and research and data analysis.

OUR TEAM

CITY OF GLASGOW COLLEGE

Stuart McDowall
Head of Innovation & STEM

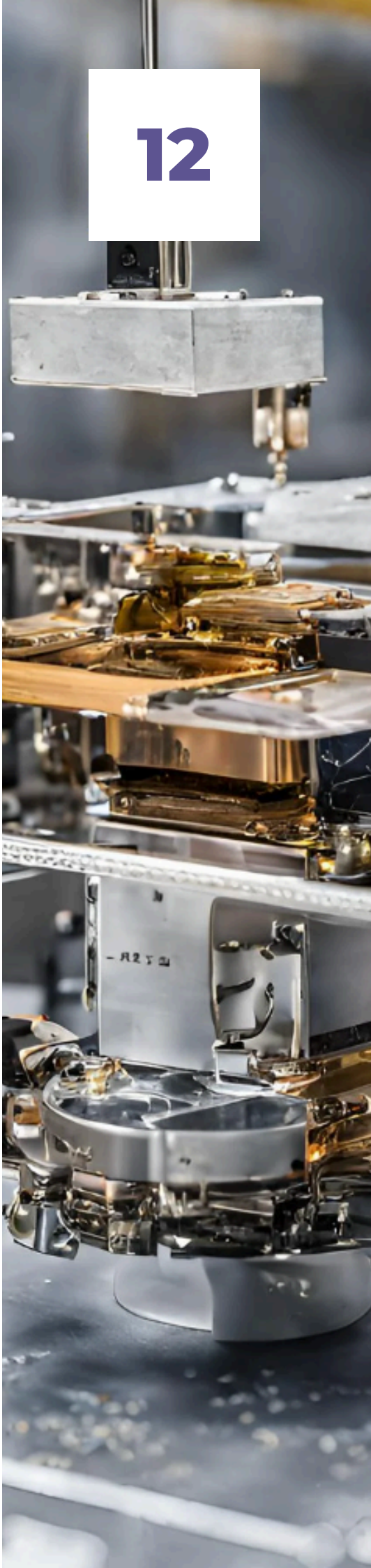
Christian Hammond
Lecturer

Graham Paterson
Lecturer

Fife College

Robert Campbell
Academic Head (Engineering & STEM)

Jenni Doonan
Head of Projects



The successful execution of our activities contributes to the broader goals of progress, sustainability, and education across the Scottish Space sector. We look forward to building upon our achievements and forging new pathways towards a brighter and more sustainable sector in Scotland.

CITY OF GLASGOW COLLEGE

190 Cathedral Street,
Glasgow, G4 0RF

0141 375 5555

www.cityofglasgowcollege.ac.uk

Fife College

Pittsburgh Rd,
Dunfermline KY11 8DY

0344 248 0115

www.fife.ac.uk

Funded by UK SPACE AGENCY