

Board of Management Learning & Teaching Committee

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| Action | For Discussion |

1. Recommendations

It is proposed that the Learning & Teaching Committee (LTC) consider and discuss the contents of this paper upon the progress and development of the Electrical, Electronic, Automation and Digital Technology curriculum areas.

2. Purpose of report

This report is intended to provide an insight for the LTC into curriculum activity by exploring development and progress within the curriculum areas of Electrical, Electronic, Automation and Digital Technology. The report will show through examples, how the curriculum areas are positively engaging both internally and externally to provide high quality learning and teaching.

3. Context

The Associate Dean (AD) for Electrical, Electronic, Automation and Digital Technology started on the 14th of January 2019. This area forms part of the Faculty of Nautical and STEM and accounts for 11,748 credits. The curriculum responsibility is broken down into four areas across both campuses: Electrical One, Electrical Two, Software Development and Computer Networking & Cyber Security.

Future manufacturing processes will depend upon the development of the digital twin concept and in the up-skilling of the current Scottish workforce into emerging employment. Having a curriculum that mimics this industry model gives CoGC the potential, through development, to be a leading partner in this area. The curriculum areas enjoy, and are actively seeking, partnerships with industry and external training partners. A brief overview of current and emerging practice is offered below:

Self-Evaluation of Learning & Teaching

High performing curriculum teams are critical for delivering high quality learning and teaching. Teams meet frequently to consider curriculum concerns and to evaluate the quality of delivery. Course Improvement & Action Meetings (CIAM) are carried out to evaluate quality. These meetings are carried out each block.

There is an expectation that Curriculum Heads (CH) are aware of *How Good is Our College* and can hold meetings to discuss parts applicable to the learning and teaching student journey. Meetings upon these themes should explore: what worked well, how this is evidenced and what impact it had. The themes should include:

- Impact of Student Voice.
- Employability.
- Equality & Diversity.
- Impact of Teaching Enhancement – additional activity.
- Post Course Destinations.
- Key Performance Indicators.

Action plans with evaluatively written SMART targets are developed to deal with development issues arising from meetings upon these themes.

Additional Activity, Riverside Campus: Electrical One & Two

- The AD is in discussion with City & Guilds to gain approval to deliver electrical installation courses:
 - 18th Edition BS7671 (IET) Regulation Courses.
 - 18th Edition BS7671 Inspection & Testing of Electrical Installations.
 - 18th Edition BS7671 P.A.T.
 - Electrical Installation Apprenticeships.

These courses can provide significant commercial revenue and create relationships with electrical employers.

- The AD is engaging with Kirkintilloch High School to deliver an IET Faraday Challenge Day. CoGC STEM Girls and staff will participate in this one-day event. Eighteen groups of school pupils will participate.
- A recent conference at the Advanced Forming Research Centre (AFRC) highlighted the Digital Twin for industry. The Associate Dean gathered four manufacturing industry experts and CoGC staff to participate in a research project to help develop a skills system for the National Manufacturing Institute for Scotland (NMIS). This had the added benefit of securing training with a significant Glasgow employer who had previously been embedded with West College Scotland. The AD, jointly with the AD from Mechanical Engineering, plan to make this a monthly occurrence to invite employers in for a tour/discussion were we currently have no relationship.
- The need for the digital twin concept was reinforced at an advanced manufacturing conference hosted by the Energy Skills Partnership (ESP). Almost all of the electrical teams attended this event. Jamie Hepburn, the Minister for Business, Fair Work and Skills presented the Scottish Governments vision and objectives for manufacturing. Discussions from industry speakers on the digital twin included: Industry 4.0, the next manufacturing revolution, up-skilling for Industry 4.0, mechatronics for advanced manufacturing, building information modelling, NMIS, digital readiness for digital manufacturing and automation & robotics in the oil & gas sector.
- CoGC has invested heavily with an automated advanced manufacture line within the Riverside Stem Centre. The line was commissioned in late January, is now operational and will be part of the HNC/D Mechatronics course that is currently being developed by staff. Staff are being trained in the equipment at present. This HNC will be in place for next session and will replace HNC/D Electronics. No other Scottish college is combining the engineering and digital areas and supporting this with such significant investment.

- Approval is being sought from the British Plumbing Employers Council (BPEC) for a “Safe Isolation” commercial short course. This will initially bring in £3,500 from Dieselec Thistle Generators but once approval is gained will be able to be run as a commercial short course for any employer.
- The AD is currently working on a project with Sky Television. Sky invited CoGC female students to participate in a project to gain a female perspective on their operations. The AD and CoGC “STEM Girls” will be visiting Sky studios in London on the 24th of April as part of the project. Out of six colleges, CoGC are the only Scottish college to participate.

Additional Activity, City Campus Curriculum:

Software Development and Computer Networking & Cyber Security

- CoGC will partner with Broadridge, a multi-national financial software company with a base in Edinburgh. This partnership will include a software hub based at CoGC that will serve as a focal point for:
 - Broadridge providing students with “real life” projects to work on.
 - Broadridge recruiting students for employment from CoGC.
 - Broadridge employees giving guest lectures/lessons at CoGC.
 - COGC lecturers receiving professional development at Broadridge.
 - Broadridge contributing financially to set-up of software hub.

Once established, the software hub will target attracting more companies to engage with the college with like projects.

- The software team contribute to significant efficiency savings through adoption of university style lectures for graded unit students. Eight cohorts (172 students) are given lectures as one group. Lectures run for 45-minutes, with four lectures given in the three-hour session. These hours are being recycled to provide lecturer provision for the software hub at no extra cost to the college.
- The combined curriculum area is participating in World Skills in two competitions: Network Infrastructure Technician & IT Solutions for Business. The number of areas competing is expected to grow in 2019/20 as curriculum areas develop, e.g. Cyber Security and Robotics.
- The curriculum area has created a Cyber Security Club, this offers students the chance to explore areas of cyber security that lie outside the normal curriculum. Industry expert Andy Gill who specialises in penetration tests is collaborating with the club.

- February saw the introduction of guest lecturers. The first was from industry expert & Napier University Cyber manager, Vassilis (Basil) Manoussos. This was well received by students. Basil has been called as an expert witness in many high profile court cases and demonstrated his expertise with a first class presentation that provided a real insight into cybercrimes. Students were also shown how many aspects of their identity can be easily revealed by tracking and collating information they post online. Surprisingly, a lot of this crime is enabled by pictures. Subsequent lectures/presentations have taken place from: Dell, Exchange Communications and Obashi
- The AD has entered into discussion to partner with the Bletchley Park Trust (code breaking, enigma code, cyber security etc). The trust are interested in collaborating in the generation of teaching materials and sharing resources for mutual benefit. The trust is currently a museum with a thriving learning and teaching provision that has a focus on schools.
- Cyber Security and software staff will contribute to the new Mechatronics engineering HNC at Riverside campus (HN Units: Computer Programming J0HA 34 and Data Security J0H9 34). It is planned to teach these at City, with students travelling from Riverside. This will help bring the four curriculum areas closer together and provide engineering students with digital skills that can be used on site. This is the first time these curriculum areas have collaborated and was widely promoted in *The Herald* newspaper: https://www.heraldscotland.com/business_hq/stem/17469300.stem-gearing-up-for-seismic-change-at-city-of-glasgow-college/
- Liaising with the Digital Skills Partnership (DSP) the curriculum team have consulted with Abertay, Napier & St. Andrews universities to review resources for the HN cyber framework. Follow up meetings to explore access of Napier University servers to deliver the CoGC cyber security curriculum and use of Napier learning & teaching resources have; and are to take place. The DSP have also been working closely with CoGC to explore development of CPD programmes for cyber security.
- The Curriculum Head for Cyber Security is chairing the validation panel for the HND in cyber security that will be launched next session. This should advantage the college in the delivery of this new course.

4. Impact and implications

The activities detailed above demonstrate external engagement and a move towards a different curriculum provision. Industries that were historically labour intensive are experiencing rapid change through digitalisation of processes. The manufacturing industry is at the forefront of digitalisation with the digital twin taking over the role of concept building and digital modelling. This has been further extended into areas of fault diagnosis and repair.

The curriculum areas mentioned above are at a formative stage in moving towards this change. Future curriculum provision must take cognisance of industry wants and needs and be prepared to provide solutions through continuous innovation. Curriculum areas must develop links with industry to be a serious partner and this process has already started, e.g. Dieselec Thistle Generators, Broadridge etc. These partners are already planning to bring new business to the college.

The set-up of the software hub will require investment from CoGC in the form of a dedicated space and ICT infrastructure. This will form the content of a separate paper. The necessary protections within our ICT infrastructure are causing unintended inhibitors to the cyber security curriculum. This needs to be addressed as a priority if CoGC is to remain a front runner in this subject field.

The four curriculum areas must take **inspiration** from industry employers to provide **excellence** in learning and teaching processes that are fit for industry. Students receiving high quality learning will be able to access the required competency for industry. This will be achieved through **innovation**, a key priority of the SFC, that will engage employers with curriculum design.