

Faculty of Science, Technology, Engineering and Mathematics (STEM)

QUALITY REPORT 2020/2021

Table of Contents

The Faculty Quality Report data collection template and report format	
Overview of the Faculty of STEM and 2020/21 highlights	4
The figures at a glance	5
Faculty-wide quality improvements	6
Systems and Processes improvement initiatives	6
Faculty-wide Teaching Innovations	7
Our role in responding to COVID-19	8
Athena SWAN and Gender equality	8
Items for Faculty escalation	9
Quantitative Data to inform Faculty Performance on key metrics for Annual Faculty Quality Report	
Appendices	
Appendix A: Retention by standing and Faculty	
Appendix B: UG Student Body by Faculty & Gender (n)	
Appendix C: UG Student Body by Faculty & Gender (%)	
Appendix D: Student Body by Faculty & Fee Status	
Appendix E: Faculty STEM by Programme	

The Faculty Quality Report data collection template and report format

This quality report is based on information submitted by the Schools in the Faculty of STEM, with input from the three STEM research institutes (CRANN, TBSI and TCIN) and the multiple research centres that are either hosted by STEM Schools or to which STEM researchers contribute. The data is gathered and reviewed by both the Dean of the faculty of STEM, Prof. Sylvia Draper and the Faculty Administrator, Dr Katie O'Connor.

Prior to final submission and approval, the FSTEM quality report is discussed at a dedicated Quality Faculty Executive with the Quality Officer (31st March 2022). As a recommendation from the 2019/20 Annual Quality review, each FSTEM Faculty Executive Committee in 2021/22 included Quality as a permanent agenda item. This was used to prompt and raise issues for consideration throughout the academic year. An example in this current year was the review by the Schools of the student survey data and the prioritization of actions arising at school level.

We wish to acknowledge and thank the Vice Provost / CAO and the Quality office for taking on-board the Faculties' feedback on the quality process and the clear escalation routes for items that require broader college input. In particular, we welcome the streamlined quality report template which we believe, captures the essential data that forms the cornerstone of the report, highlights the main relevant matters, and brings Quality further to the forefront.

Previous versions of the quality template were becoming a catch-all for an array of matters from risks registers, health and safety issues, to policy and system implementation. The catchment of matters was increasing annually and often the focus on quality was becoming obscured by the overly inclusive nature of the report.

Overview of the Faculty of STEM and 2020/21 highlights

The STEM Faculty consists of eight schools, each of whom has worked hard to ensure teaching and research continued to be delivered during the pandemic. 'Doing things differently' was the theme for the Faculty in 2019/2020 and this became the practical reality in schools across the faculty as they had to embrace flexibility while re-designing research programmes, modifying course content, revising learning outcomes, and re-thinking modes of assessment and delivery.

The complementary theme of 'togetherness' came to the forefront throughout 2021 as staff and students, operating under reduced budgets, applied their problem-solving skillsets to the challenge of maintaining a quality learning experience. Despite the financial constraints (5% OPEX cut applied), the faculty pooled resources and expertise to strive to retain research and teaching excellence. It is with great credit to the individuals involved, that three of the recipients of Trinity Excellence in Teaching Awards in 2021 were from STEM (Profs Stephen Barrett, School of Computer Science & Statistics, Justin King, School of Engineering, and Cormac McGuinness, School of Physics)

The schools' budgets could have been further impacted however all the schools in the Faculty retained the percentage of research productive staff, thereby ensuring this portion of their baseline budgetary model (BBM) budgets remained intact. Conscious of the potential consequences of reduced budgetary allocations STEM schools continued throughout 2021 to work to diversify their revenue streams. Many schools increased their undergraduate CAO quotas and created new courses (PG certificates, diplomas and Master courses) that are attractive to different student markets. In this way the Schools responded positively to governmental and student demand for additional places in STEM courses. Particular highlights in 2021 have been the Schools' engagement with new marketing strategies (e.g. virtual open days, salon and on-line events) and their work with Academic Registry around student recruitment, application and registration. The IT processes governing the recruitment and processing of student applications and the monitoring of student registrations in all courses continues to be a challenge at school level. In many cases the programme architecture of the IT systems fails to support modular enrolment effectively and involves time-consuming work arounds that reduce the time available for research and teaching. Growth in non-EU UG student numbers however was achieved across many schools in the Faculty through their proactive student-facing responses to queries and applications and in particular from the success of the International Foundation Programme and Columbia dual-degree programme which expanded to include Geosciences.

The faculty is driving a number of significant capital (e.g. E3 Learning Foundry) and infrastructure projects (e.g. those funded through SFI and the Ryanair Sustainable Aviation Centre). New programmes associated with the E3 (Engineering, Environment and Emerging Technologies) and HCI (Human Capital) Initiatives continue to be developed across six of the eight schools. Such initiatives, including the Kinsella Challenge-based PhD awards (lead by PIs from three STEM schools) seek to prepare students for a rapidly changing multi-disciplinary world. Existing and potential partnerships are being developed with Global relations (e.g. targeting MENA and South East Asia) and many of the Faculty's activities are gaining philanthropic (6 philanthropically supported posts created across the Faculty) and industry support (e.g. Microsoft Ireland MSc and THREE UG student scholarships). These activities are helping to provide much needed supervisory capacity to support additional PhD studentships and to diversify the UG student body in STEM.

The figures at a glance

The number of UG modules being provided yearly is increasing. STEM schools offer a total of 598 taught Undergraduate Modules compared to the 511 UG modules provided in 2019/20. The percentage of the modules that were subject to student evaluation however decreased with 470 (79%) being evaluated in 2020/21 and 469 (92%) in the previous year. These trends need careful monitoring as new courses come on-line but many schools indicated on-line survey fatigue as a cause of concern for students and undertook different forms of face-to-face feedback (e.g. by meeting class and student representatives). Most schools in the faculty offer open modules with a total of 63 open modules across STEM schools. The return of external UG examiner reports across the Faculty was 94% in 2020/21 which again is a drop compared to the 100% return rate in 2019/20. There were issues encountered in relation to numerical agreement between the Quality Reports expected by the Quality Office and the schools. In some cases this is due to an examiner providing one report in relation to a multi-school programme. In 2020/2021 the schools delivered 24 PGT Programmes many of which are multi-school. We are pleased see that there has been an improvement in the percentage of PGT external examiners' reports returned at this point in the year, in 2019/20 there were 74% PGT external examiners' reports received, this year the returns have increased to 87%.

Several areas for improvement are highlighted below in the Items for Faculty Escalation. These have come to light from discussion at STEM Faculty Executive Committees throughout the year and were raised at the dedicated Quality Faculty Executive. One of these is that of recruiting and retaining suitable external examiners. External examiner reports have a particular and significant status in terms of providing an external validation of the quality of our courses and of the student experience. Their content is highly valued by the Quality Office and the Schools.

Faculty-wide quality improvements

In Table 7: Quality initiatives and issues for escalation are captured for each of the eight schools. We wish to further highlight some of the STEM school initiatives in the following section:

Systems and Processes improvement initiatives

As a recommendation from the 2019/20 Annual Quality review, each FSTEM Faculty Executive Committee has Quality as a permanent agenda item. This is used to prompt and raise issues for consideration throughout the academic year. An example this year was the review of the School survey data (e.g. declining faculty:staff interactions and quantitative reasoning metrics) and the prioritizing of the actions arising from this review at school level.

Many schools have reported developing labour-intensive workarounds for system processes that are based around programme architectures rather than around modules. There are many examples. One which was resolved with support at faculty level was the creation of a student repository for project/theses arising from students on the BAI/MAI/MSc Engineering courses. In 2022, we welcome the addition of an Academic Registry (AR) Faculty liaison officer. This post aims to support schools in their interactions with AR and to raise an understanding and awareness of the common issues arising across Schools and Faculties.

One time-saving and effective tool that has gained traction and use across STEM schools in 2021 has been the Power Bi tool for checking, recording and visualizing registered student FTEs in courses across the Faculty. This has provided a valuable source of data for School planning and for a consistent review of data across multiple years. It has also allowed schools to identify errors in the distribution of sFTEs in open and shared modules particularly as they effect the different Science course streams in freshmen years.

Faculty-wide Teaching Innovations

The pandemic provided both obstacles and opportunities for reflection and improvement in the Faculty. The following are representative actions undertaken by STEM schools which have led to quality improvements in their teaching provision:

- Due to Covid19 restrictions, we had to re-think how to approach course assessments and how examinations would be conducted.
 - All STEM Schools reviewed their portfolio of assessments and where necessary conducted online exams during the Covid pandemic.
 - In the School of Physics, the role of Year Head was re-defined and re-energised in order to improve rapid communications to students due to online study and also for staff, in terms e.g. of the timing of continuous assessment deadlines. The Year Head delivers a comprehensive overview and Q&A meeting at the start of the year, and a complete plan of lectures and deadlines to help students manage their workload. The School of Physics worked with the VP/CAO to reschedule the final year in-person exams.
 - All STEM schools felt that their engagement with external examiners improved by the move to online of the court of examiners.
 - Moving certain exams online heightened the need for plagiarism policies to be enforced, and practices to be communicated with students and checks to be undertaken.

- Adapting face to face teaching delivery in line with restrictions/ protocols

- The range of e-learning and online teaching offerings vastly increased throughout the Covid-19 pandemic as did the volume of teaching content stored onto LMS blackboard. Many schools have continued to record lectures as supports to student understanding and revision.
- The school of Chemistry prioritized the delivery of practical laboratory classes for chemistry students and doubled the number of laboratory sessions so that that student numbers in each lab were reduced – this provided the students with more face-to-face contact hours and was highly appreciated by students (as reported by the School Convenor)
- The School of Physics restructured their JF tutorials which are now directly associated with the lecture courses, via new 'scaffold' problem-solving materials.

Moving teaching online

• The school of Mathematics provided final year project students with one-to-one online zoom sessions to support them during their projects. A virtual 'help room' was created for JF and SF students as they had limited face to face teaching during the pandemic. Hamilton Summer internships and an online poster session were run remotely in 2020/2021.

Investing in teaching delivery

- The School of Engineering has established the position of an interdisciplinary MAI project coordinator. This ensures that resources across the school are optimized to deliver the highest quality masters research project experience (30 ECTS) on the MAI programme.
- The School of Engineering invested in an upgrade of teaching facilities to accommodate an improved space for face-to-face delivery in the Museum Building.

- Mentorship
 - In the School of Natural Sciences, the new CHARM-EU MSc in Global Sustainability Challenges has established mentors for the students enrolled on the programme. Mentors evaluate the students' electronic portfolios and give them advice on how to improve.
- Improved communication
 - The School of Computer Science and Statistics systematically improved its online communications with students and staff to provide more frequent and timely updates regarding teaching.
 - School activities in Genetics and Microbiology were showcased on digital noticeboards/screens enabling greater connectivity between the personnel in the separate buildings that house the School.

Our role in responding to COVID-19

Many researchers in the STEM Faculty continue to work on innovative research projects that aim to understand, and combat COVID-19.

Athena SWAN and Gender equality

The Faculty and STEM Schools are actively promoting Athena SWAN principles. Three schools were awarded Athena SWAN awards in 2021 (The Schools of Engineering, and Computer Science and Statistics successfully secured bronze awards in March 2021 and Biochemistry and Immunology obtained its bronze award in Sept 2021). This leaves one STEM school still working toward an Athena SWAN award. All 8 schools however have active School Athena SWAN committees, many of which been re-constituted as EDI Committees, and are working to implement School Athena SWAN action plans. In the case of the school of Genetics and Microbiology, a new directorship position was added to the School Executive, the Director of Equality, Diversity and Inclusion (EDI), highlighting the importance of implementing EDI practices within this School. The Faculty of STEM administrator in collaboration with the other 2 Faculty administrators hosted an online event to celebrate International Women's Day in March 2021. This followed the positive feedback arising from a similar event in 2020.

Items for Faculty escalation

There are several items that are for Faculty escalation as they are beyond the scope of individual schools; these items include:

Systems and Processes

Many schools have reported developing labour-intensive workarounds either at School level or injunction with staff in Academic Registry. These have been developed to circumvent the inflexibility of an IT system and system processes that are based around programme architectures rather than around modules. There are many examples, but these include the batch processing of applications into the very popular Data Strand of the Computer Science PG programme, the company invoicing of registration fees for individuals on PG diploma and PG Cert courses and the on-going challenges experienced around registrations involving microcredential offerings that are being developed (e.g. in engineering) under the HCI initiative.

Space

The quality, appropriateness, capacity and availability of space is limited across the Faculty. The demands on existing space are increasing and being felt more acutely on the return to on-site teaching with increased class sizes. The Faculty is struggling to provide additional new space/reconfigure current space to meet need the demand. The Faculty continues to work closely with the Schools and the Space Planning Officer to create an accurate STEM-based space atlas and to assess how the roll-out of the blended working model will affect space usage. The Faculty would welcome a long-term, workable strategy to address the use, access and sharing of space. It would also like to have oversight of the Faculty's accommodation footprint via the College's space atlas and to determine the density of occupation and the population of existing spaces.

Current concerns around space are:

- The unsuitability of Goldsmith Hall as a large lecture venue. This is consistently raised in surveys of both staff and students and has been an issue of concern for the Faculty as a whole, the Science Course Office and the Associate Dean of Undergraduate Science Education (ADUSE). The refurbishment and reconfiguration of the Goldsmith Hall has been costed and exceeds the Faculty budget, yet it is clear that a reinvestment in this space would have a positive impact on a significant portion of STEM students. This is particularly true STEM students in their freshmen classes some of whom spend the majority of their on-campus lecture time (up to 70%) in this theatre.
- **The Atrium in the Panoz institute** has a multifunctional role, acting as social place, study space and storage facility however it does not fulfill any of these purposes adequately. It has also suffered water damage in the past year which has yet to be repaired due to budget constraints. This highlights a difficultly around how shared spaces are maintained and used, particularly in a multi usage and cross-school/faculty occupancy building.
- **Closure of Food Outlets in the East End of College** which houses the majority of STEM student lecture theatres and teaching activities (e.g. on the ground floor of the Hamilton Building and the closure of the Science Gallery Café) has resulted in a deterioration in the student experience and lack of facilities. These closures and the on-going building and construction work which dominates the environs at this end of campus are not providing an environment conducive to learning.

 Delays in accessing new spaces. The School of Computer Science and Statistics was expecting to move to the contiguous space vacated by Trinity Research & Innovation (TR&I) in Westland Row, but the move has been delayed pending the identification of alternative space for TR&I. The occupancy of the E3 Learning Foundry is projected to be 12 months behind schedule (now Sept 2024) due to construction delays. This directly impacts 3 schools and indirectly affects those areas awaiting vacation/upgrade.

Recruitment and retention of external examiners

The recruitment and retention of external examiners has become problematic. Workloads have increased dramatically with additional courses coming on-line and colleagues are less willing to take on the additional duties. This has not been helped by the proliferation of exam sessions and deferrals for which external input is needed. In addition, the administrative burden required for applying for a PPS number is a disincentive as is the small fee they receive. This issue is restricting the pool of candidates that are willing to do the job particularly (e.g. in the school of Mathematics) where external examiners from outside Ireland has been commonplace.

In relation to the above, the following items have come to the fore through Faculty discussion:

- Increased time commitment required of external examiners (multiple examination sessions arising from deferrals, repeats, semesterisation, new courses, multi-disciplinary exams, shared modules). This has resulted in varying engagement levels of external examiners at different times in the academic cycle, a loss of external examiners during the academic year (citing over-burden), examiners struggling to attend the court of examiners meetings (online facilities have improved this) and complaints from external examiners (e.g. around Blackboard access).
- A slow return of paperwork from external examiners for whom payment is not connected to the provision of their report.
- Limited pool of externs with the skills/experiences to review courses.
- Unattractive nature of the role e.g. difficulties in external examiners securing payment from Trinity due to payment issues (PPS registration), increasing associated workload and expectations, and a lack-of return for them in the absence of networking opportunities (limited face-to-face onsite activities during the pandemic).

The Faculty of STEM acknowledge that many of these obstacles are not specific to Trinity or Ireland however the limited number of experts willing to give of their time to act as external examiners is of concern and may need proactive management at college level.

Inconsistencies between the number of External Examiner reports expected and received at School level and the numbers expected and received by the Quality Office have yet to be accounted for at the time of writing. A possible resolution of this issue might be the creation of a centralized system to manage External Examiner Reports (thereby avoiding any duplicate counting of reports relating to multi-school programmes).

UG Research Experience

There is currently no funding from the College to support SS capstone research projects that are particularly costly in STEM-based subjects. The problem needs to be addressed at a College income level as the RGAM per student particularly in the wet-based laboratory courses has not kept in line with the costs. At present, these capstone projects (up to 1k euro per student) are inappropriately funded via PI research grants. There should be a clear financial structure to support the SS capstone research project, a key selling point of our UG degrees. The problem will exacerbate if UG student numbers increase further.

Timetabling challenges

- The activities of the CTU (Central Timetabling Unit) have not led to a student-first approach in the allocation of lecture or practical slots, schedules and timetables. It has caused considerable disruption across several schools and the Schools of Physics, and Maths, in particular.
- Ongoing timetabling difficulties within the TEP architecture are forcing the school of Mathematics to reconsider its degree offerings.
- The school of Chemistry reported that the short examination period puts the students (especially JS/SS) under considerable stress with many having 4 exams and some having up to 7 exams over a 5-day period. The timing of the reassessments and their short turnaround time negatively impacted on JS students who have issues with Trinity Elective selections and their moderatorship allocations.

Staff Shortages and Retention

Across specific schools in STEM there remain core staff shortages that have arisen through delays in staff recruitment during the hiring freeze. This was introduced as an emergency measure in 2021 and is also a consequence of overspends in pay budgets across many STEM schools. The retention of staff in certain disciplines is also a critical issue (e.g. in Computer Science and Statistics) where opportunities for career advancement either in other academic institutions or in industry are abundant. Schools have also reported a greater turnover of technical and administrative support staff in 2021. These issues effect the quality of the teaching and service supports that can be provided to students. The timely recruitment of replacements to these positions has proven challenging when the remaining/existing staff, who are responsible for undertaking the work associated with staff recruitment, on-boarding, mentoring and training, are carrying the increased workloads arising from staff shortages. The well-being of staff and students has been stretched by the stresses and longer-term consequences of the pandemic. The additional demands arising from changes in lifestyles and patterns of work are affecting the quality of our teaching and learning, and research provision. All members of the STEM community have had to learn to adapt during an unprecedented period of disruption and to work to embrace a 'new normal'.

Quantitative Data to inform Faculty Performance on key metrics for Annual Faculty Quality Report

Table 1: UG student module evaluation – Science, Technology, Engineering and Mathematics (STEM)

School	Number of Undergraduate Modules taught	Number of Undergraduate Modules Evaluated	Percentage of Undergraduate Modules Evaluated	Average response rate to UG module evaluations (%)	Comments/Actions arising Evaluations
Biochemistry & Immunology	44	28	63%	Varies 10-60%	Many students requested retention of Online recorded versions of lectures Very positive response to new JS open modules Students generally preferred option of online assessment. Positive response to online "real time" version of oxidative phosphorylation practicals (BIU22201)
Chemistry	61	0	0	See comment	Student surveys had a poor return rate in 2019/20. This year student feedback was obtained via (i) UG and PG representative reports at the monthly School Executive Committee meetings (ii) individual lecture feedback sheets (iii) Student meetings with DUGTL and DPGTL.
Computer Science and Statistics	88	88	100%	37%	Through Course/Module-level surveys and meetings with student representatives the School undertook an exercise of Student CA workload mapping in Year 3 ICS during Semester 2. The results showed that CA was reasonable and fairly distributed in the semester. Other actions involved emails to teaching staff reiterating the importance of communicating regularly with students through blackboard.
Engineering	93 (years 1 to 4)	93	100%	Good response rate due to method of evaluation.	Evaluations with the student representatives in each semester before assessments. Feedback discussed with the module coordinators and actions taken.
Genetics and	51	See comment	See comment	See comment	For the 2020/2021 academic year, given that all these UG modules

Microbiology					were online, and many lectures were prerecorded, we did not undertake the same evaluations that we usually undertake. We will revert to implementing these evaluations for the academic year 2021/2022. During the Covid-19 pandemic, from March 2020, the School was without a School Manager, and for part of this time also without an EO in Genetics/Human Genetics. This situation will change in early 2022 facilitating these types of activities for the next academic year.
Mathematics	55	55	100%	45%	
Natural	168	168	100%	100%	
Sciences					
Physics	38	38	100%	14%	Response rates were very low with online module evaluation over Blackboard. For this reason, the SoP has reverted in-person paper forms, with set in-class evaluation time in A/Y 2021-22. Following evaluations and class representative feedback for 2020/21, taken together with our own judgement, we have taken actions including remaining with online exams in 2021-22, redoubling efforts to maximise face-to-face teaching and tutorial provision, and improving Blackboard communications and lecture release timing to help students better manage their learning.
Faculty Total	598	470			

School	Title of Open Module(s) offered, in full	Actual response rate to Open Module evaluations using USC approved survey questions (%)	Comment/Actions arising from Evaluations
Biochemistry	BIU 33350 Molecular Basis of Disease	33% response to surveys	Overall positive feedback. The main change
&	BIU33250; Introduction to Immunology & Immunometabolism	but questions were not	requested was for a summary lecture at the
Immunology	BIU33250; Introduction to Immunology & Immunometabolism	necessarily USC approved.	end of or during the module.
	BIU33150 Biochemistry for Biosciences		
Chemistry	BYU11101: From Molecules to Cells I		
	PYU11F10: Foundation Physics for Life and Earth Sciences		
	PYU11P10: Physics 1		
	PYU11P20: Physics 2		
	BYU22201: From Molecules to Cells II		
	BYU22202: From Cells to Organisms		
	PYU22P10: Physics 1		
	CHU44205: ADVANCED ORGANIC CHEMISTRY		
	CHU44705: ADVANCED COMPUTATIONAL CHEMISTRY		
Computer	N/A	N/A	SCSS has no dedicated Open Modules.
Science and			Students taking SCSS modules as Open
Statistics			Modules are included in the general surveys
			abovo
Freeineerine		NA	
Engineering	NA	NA	NA

Table 2: Open Module Evaluation – Science, Technology, Engineering and Mathematics (STEM)

Genetics and Microbiology	Genomics and Systems Biology	The response rate for the questionnaire-based evaluation for the open module was approximately a third.	This new open module was evaluated. Overall, the module received positive responses. A number of students responded that a greater use of CA for this module would have been preferable. This issue is being considered, but if implemented, will not be in place until 2022/23.
Mathematics	NA	NA	We do not offer open modules
Natural	BOU44107 Plant Animal Interactions		
Sciences	FBU44060 Plant Breeding and Biotechnology		
	BOU44111 Restoration Ecology and Rewilding		
	GSU33003 Ice Age Earth		
	BOU33105 Global Environmental Change		
	BOU33126 Mycology		
	GGU22006/GSU22006 Physical Geography Dynamic Earth		
	GGU22925 Human Geography Changing Worlds		
	GGU33931 Environmental Science		
	GGU44968 Historical Geography		
	GLU44005 Advanced Palaeontology		
	GLU44006 Carbonates: from the Atomic to the Planetary Scale		
	GLU44007 Earth Resources for a Childai Future		
	GLU44008 Early Earlin Evolution		
	GLU44009 Geoscience for a Sustainable Planet		
	GLU44011 Palaoocoanography and Palaooclimatology		
	GLU44011 Palaeoceanography and Palaeocimatology		
	GGU/4012 Naw Materials in Buildings		
	GGU44975 Coastal Wetlands		
	GGU11006 Human Geography: Exploring		
	the Interconnected World		

	GLU33008 Metamorphic Rocks and Processes	
	GLU33009 Hydrology and Groundwater Quality	
	GLU33928 Structural Geology	
	GGU33958 Red Planet	
	GGU33933 Geographical Information: Data and Tools	
	GGU33010 Living on the Edge: Estuaries and Coasts	
	ZOU33010 Fundamentals of Ecology	
	BOU33105 Global Environmental Change	
	GGU33011 Earth's Climate Past, Present and Future	
	GGU33012 Natural Hazards	
	BOU33123 Soil Science	
	BOU44113 Senior Sophister Field Skills	
	GLU22007 The History and Evolution of Life on Earth	
Physics	PYU33A03, PYU33A17, PYU33C01, PYU33P04, PYU33P07,	Note all these modules are core modules on
	PYU33P15	some courses while being open modules on
		other courses. Hence, response is as for the
		UG student module evaluation entry above.
Faculty Total	63	

 Table 3: Undergraduate External Examiner Reports - Science, Technology, Engineering and Mathematics (STEM)

School	No of External Examiner Reports Expected (UG)	No of External Examiner Reports Returned (UG)	% of External Examiner Reports Returned (UG)	Did the School respond in writing to EE recommen- dations?	Did the External Examiner(s) have or request access to Blackboard?	Comment/Actions arising from EE Reports
Biochemistry & Immunology	4	4	100%	Yes ⊠No□	Yes ⊠ No□	Minor changes to assessments implemented Only 1 external examiner requested access to Blackboard which they were given
Chemistry	5	5	1000%	Yes ⊠No□	Yes ⊠ No□	School Administrative Manager is actively chasing the author of the remaining EE report.
Computer Science and Statistics	5	4	80%	Yes ⊠No□	Yes ⊠ No□	School has been endeavoring to communicate with the External Examiner to seek the outstanding report. As yet this has not been forthcoming, but efforts will continue.
Engineering	6 (includes year 5 MAI)	6	100%	Yes ⊠No□	Yes ⊠ No□	Civil, Structural and Environmental Engineering – Content of curriculum is complete for Year 4 and 5 of the programme. The stream has taken on the feedback of the external examiner and implemented a feedback protocol and new criteria for marking MAI projects and coursework. Biomedical Engineering - The extern commended staff on offering up to date and topical content and commented that additional faculty with unique BME focus areas would improve the programme (medical image analysis, signal processing, data science, robotics and rehabilitation). Computer Engineering – well designed and organized curriculum with appropriate assessment and consistent marking. Recommended that marking schemes be provided to students on all modules as standard practice.

						Electronic Engineering – standards are being maintained and content constantly updated. Recommended using 'take home tests' post pandemic balancing them with more traditional assessment. Recommended improving Year 5 project feedback. Particularly commended use of take-home kits for students and computer cluster provision.
						Engineering with Management – the quality and standard of assessment and marking was fair and consistent. The extern commented that there is a good balance between engineering and management in the taught module element but the projects could contain more management related topics.
						Mechanical and Manufacturing Engineering – The extern commented on the outstanding job of pivoting to online teaching and assessments. The shift to problem based learning and increased CA was welcomed by the students but workload balance and improved processes around feedback should be considered.
Genetics and Microbiology	3	3	100%	Yes ⊠No□	Yes ⊠No□	Microbiology will change marking rubric for the SS essay marking scheme in-line with the recommendations. Prior to exam marking period, a memo will be sent to staff to remind them to annotate scripts with comments that justify grade awarded and which are in-line with the marking guidelines.
Mathematics	2	2	100%	Yes ⊠No□	Yes ⊠No□	
Natural Sciences	7	6	86%	Yes □No⊠	Yes ⊠No□	Some reports were sent to HoD, rather than Quality Office. DUTL did not have access until this year, and there are still issues with closing what is a legacy issue. Senior lecturer is informed.

Physics	3	3	100%	Yes ⊠No□	Yes □No⊠	Written responses were provided to the Externs' comments on individual JS and SS papers (also the Externs for the Theoretical Physics and Nanoscience moderatorships), and verbal responses were provided on the overall recommendations. Papers, solutions, and exams scripts were provided to the Externs over OneDrive/SharePoint.
						Concerning Examiner's report comments, the School explained to the Physics Extern that its practice remains to read through all students at the annual CoE, even if their progression / classification is straightforward. We have redoubled our emphasis that all final-year projects (and marking) must have the oversight (and signature) of an academic staff member, and assured the Extern of this. An information session on 2021-22 SS capstone projects placed a greater emphasis on how students can more rationally choose project preferences, following the Extern's feedback. There remains a difference of opinion with the Physics Extern on the degree to which any bookwork is appropriate in open-book exam questions, a number of very experienced lecturers feeling that it is necessary. The modules' grade profiles remained quite reasonable in 2020-21. More interaction by students with peers has been enabled by the return to face-to-face teaching. The Extern's comments were very supportive and reassuring.
Faculty Total	35	33				

School	No. of PGT Programmes	No. of PGT Programmes Evaluated	% of PGT Programmes Evaluated	Average response rate to PGT programme evaluations (%)	Comment/Actions arising from EE Reports
Biochemistry & Immunology	2	2	100	25	Comments: The students stated that there was little time between the lectures and the start of the exams. Actions: The timetable was modified this year to give the students more time to study after the lectures were completed and before exams started. Comments Increased time for assessments, more tutorials
Chemistry	0	n/a	n/a		PGT shared with Physics (see below)
Computer Science and Statistics	3	1	33%	33%	SCSS offers 3 PGT Programme which are disparate in size. Programme/module surveys were conducted for the MSc in Computer Science, the largest cohort. The low response rate is due to the fact that a number of modules are also taken by 4 th year students and were included in the Undergraduate survey results. All 3 programmes held regular student meetings, some as often as fortnightly, to capture and respond to student feedback and concerns during the pandemic.
Engineering	12 (7 Diplomas and 5 MSc/MPhil)	12	100%	Approx. 60%	Feedback discussed with the module coordinators and actions taken.
Genetics and Microbiology	1	1	100	Approx. 50%	Course coordinators held an evaluation session with students following the first year of the MSc in Genomic Medicine. Feedback was positive. Concerns were raised about open module "Research Integrity and Impact in an Open Scholarship Era" this is run by TCD Library and the students' feedback was passed on to the module coordinators. Some timetabling issues were noted and resolved for new academic year.

 Table 4: Postgraduate Module Evaluation - Science, Technology, Engineering and Mathematics(STEM)

Mathematics	1	1	100%	68%	
Natural Sciences	4	4	100	100	Quicker return of grades to students has been flagged by some external examiners. This was actioned for subsequent years.
Physics	1	1	100%	59%	The student feedback was in general very positive. Some constructive feedback included the reduction of content in certain parts of specific modules and a reduced workload for the continuous assessment of the Introductory Module CH7001. The Energy Science Management has already met to discuss these issues and has outlined a series of measures to address them in the next academic year 2022/23. In addition, the Course Director of Energy Science has met with the DPGTL in the School of Physics and together they have outlined another set of new measures to reduce the workload of academic staff involved in the teaching of this course, as the student numbers is expected to continue increasing in the next few years
Faculty Total	24	22			

Table 5: Postaraduate External Ex	xaminer Reports - Science.	Technology. Engineering and	Mathematics (STEM)
· · · · · · · · · · · · · · · · · · ·			

School	No of External Examiner Reports Expected (PG)	No of External Examiner Reports Returned (PG)	% of External Examiner Reports Returned (PG)	Comment/Actions arising from EE Reports
Biochemistry & Immunology	2	2	100	Comments: The external examiner recommended that comments be made on the exam scripts so that the students can receive feedback.
				 Actions: This change has been implemented for this year to give more student feedback. Comments Fewer MCQ based assessments, marks abnormally high for online exams, switch to in person where possible.
Chemistry	n/a			
Computer Science and Statistics	3	3	100%	
Genetics and Microbiology	1	1	100%	External examiner lauded a successful first year of our new MSc and made positive comments on our handling of a rapidly changing pedagogical environment effected by the Covid pandemic.
Mathematics	1	1	100%	
Natural Sciences	4	2	50%	

Engineering	12	11 confirmed	Dip in Project Management	Course content is to the standard expected. Recommended that questions for open- book exams be reframed to suit the format.
		(checking on		Curriculum is appropriate with the assessment considered an exemplar for professional
		remaining 1)	in Construction	development of students. Recommended that students be required to present a stronger evidence basis in their risk assessment documentation.
				Curriculum content, assessment and marking were all found to be of the appropriate
			Dip in Fire Safety Practice	standard with video recording of lectures highlighted as an example of good practice.
				Well-designed programme with a good mix of assessment which were fairly and consistently marked. Recommended greater consistency in the level of feedback across modules.
			Dip in Construction Law	
			and Contract Administration	Additional details provided in the assignment descriptions including word count.
			Dip in Environmental Monitoring, Assessment	Examples of coursework now available to students
			& Engineering	The external examiner reported that this was an excellent programme which attracted high quality students but noted the following:
			Dip in Sustainable	
			Energy	 There is significant disparity between the number of modules offered in each stream
			MSc in Engineering	2. There is imbalance of formative/summative assessment in the programme
			[Environmental, Structural &	The examiners seem to mark within a very narrow band of marks, with most modules having marks from low 50s to low 70s
			Sustainable Energy]	The main issue we have is not enough staff to deliver a hardware EEE curriculum. This

			MSc in Electrical	has been commented on in external examiner reports since 2016. We are very slowly increasing staff numbers from 7 in 2018 to 12 now.
			Information Engineering	The extern commented that additional faculty with unique BME focus areas would improve the programme (medical image analysis, signal processing, data science, robotics and rehabilitation)
			MAI / MSc in Biomedical	Revised the description, marking forms, and marking guidelines for the Master's Thesis project.
			Engineering	ensure that similar marking rubrics and standards were consistent between modules.
			MPhil Music and Media Technologies	College did not formally appoint the extern, though he did anyway help us by monitoring the course, moderating marks, etc.
			MSc in Mechanical Engineering	
Physics	0	0	0%	Finding an External Examiner for the Energy Science course has been particularly challenging due to the interdisciplinary nature of this course. The Energy Science Management team is currently working on appointing an External Examiner for the next academic course 2022/23.
Faculty Total	23	20		

 Table 6: Professional Accreditation – Science, Technology, Engineering and Mathematics (STEM)

SCHOOL	ACCREDITED PROGRAMME	PROFESSIONAL OR STATUTORY BODY	NEXT ACCREDITATION DUE	DID ACCREDITATION TAKE PLACE IN 2020/21? IF SO, SPECIFY WHETHER IN PERSON OR VIRTUALLY	Comment if any conditions resulted from Accreditation Report outcomes e.g. reduced period of accreditation
School of	B.A.I/M.A.I Civil, Structural & Environmental Engineering	Engineers Ireland	5 years Re-accreditation in Nov/Dec. 2020 postponed (due to Covid-19). Rescheduled to March 2022.	No	
0 0	B.A.I./M.A.I Computer Engineering			No	
	B.A.I./M.A.I Electronic Engineering	-		No	
	B.A.I./M.A.I Electronic & Computer Engineering			Νο	
	B.A.I./M.A.I Mechanical & Manufacturing Engineering			No	
	B.A.I./M.A.I. Biomedical Engineering			No	
	B.Sc. (Ing) / M.A.I. (optional) Engineering with Management			No	
	MSc in Engineering (Civil)			Νο	
	MSc in Mechanical Engineering			No	
School of Physics	B.A. (Moderatorship) in Physics	Institute of Physics (IoP)	Due March 2021 but postponed due to Covid-19		
	B.A. (Moderatorship) in Physics & Astrophysics		initially to November 2021. However, this was again		
	B.A. (Moderatorship) in Theoretical Physics (joint		postponed and the IOP have		
	programme with School of Mathematics)		requested that an application for accreditation be submitted by March 2022, pending an online accreditation process later in 2022. The application is currently being prepared.		
	B.A. (Moderatorship) in Nanoscience (joint programme with School of Chemistry)				

School of	B.A./M.C.S. in Computer Science	Engineers	5 years	Online
Computer		Ireland	Re-accreditation in Nov/Dec.	interviews with
Science and			2020 postponed (due to	students,
Statistics			Covid-19). Rescheduled to	graduates, and
			March 2022.	employers to be
				held on
				9.3.2022 with
				Accreditation
				Visit to School
				scheduled for
				10.3.2022.

Table 7: Quality initiatives and issues for escalation – Science, Technology, Engineering and Mathematics (STEM)

Faculty of STEM Schools	Please outline here three quality initiatives undertaken by the School in 2020/21 that you wish to showcase as good practice/enhancement activities.
Mathematics	 The online one to one zoom sessions for final year project students with their supervisors received very positive feedback. The Maths help room had not been running since the start of the pandemic but recommenced last semester. The school decided to prioritise help room sessions for JF and SF students (in any discipline taking Mathematics modules for example Science and Engineering) who had missed out on F2F teaching. Hamilton Summer internships which continued during the pandemic and were supervised remotely by staff members and culminated in an online poster session which was well attended by all staff and invited colleagues. Aspects of this online delivery will be incorporated into future internship programmes.
Chemistry	 The recording of lectures – this activity, while necessary when teaching was online, was welcomed by students as an additional aid for comprehension and revision purposes The deployment of our Senior Executive Officer, AnneMarie Farrell, as a de-facto Sophister Coordinator. AnneMarie's engagement with the Sophister students and with the external examiners was praised by both groups and reduced the stress of what was an extremely stressful year by keeping all parties informed of what was happening, how exams would be conducted etc. and making all materials available to the external examiners We prioritized the delivery of practical laboratory classes for chemistry students and doubled up the number of labs delivered so that that student numbers in each lab were reduced – this provided our students with more f2f contact hours than most students and was appreciated by them (as reported by the School Convenor)
Computer Science and Statistics	 The continuation of the pandemic throughout the 2020/21 academic year presented some significant, sustained, and evolving challenges that in the main prohibited the initiation of new substantive quality initiatives. Rather, resources were focused and channeled into the need for agility in meeting the evolving and changing circumstances of the pandemic while ensuring that not only were our teaching, research and support services sustained but they were also maintained at the same exacting standards albeit in a fundamentally different manner. To achieve this was we would contest a fundamental quality initiative that necessitated considerable effort, imagination, and good will from across the School. In response to previous student feedback received, the School systematically improved its online communications with students and staff. This communication was better targeted and focused, was more frequent and more timely. The School completed and submitted its Athena SWAN Bronze application, stalled at the onset of the pandemic, and successfully secured a Bronze award in March 2021. The School's Athena SWAN committee has now been re-established as the EDI Committee which is actively working on the implementation of the SCSS EDI Action Plan with the aim of securing a Silver Award in 2024.

Faculty of STEM Schools	Please outline here three quality initiatives undertaken by the School in 2020/21 that you wish to showcase as good practice/enhancement activities.
Engineering	 The School has established the position of an interdisciplinary MAI project coordinator which was taken up by Professor Naomi Harte. This is to ensure that resources across the School are optimized to deliver the highest quality masters research project experience (30 ECTS) on the MAI programme. This addresses many comments from external examiners about breadth of projects offered. The School has improved its examining modes to accommodate online exams in certain modules with a view to continuing with good practices beyond Covid pandemic. The School has established good practice with appropriate levels of lecture/tutorial recording to enable flexible learning and enhance resources to students in the future. The School invested in ungrading of teaching facilities in the Museum Building.
Genetics and Microbiology	 Implementation of digital noticeboards/screens for the School, as a means of showcasing School activities in both Genetics and Microbiology and enabling greater connectivity between the personnel in the separate buildings that house the School. Adding a new directorship position to the School Executive, the Director of Equality, Diversity (EDI) and Inclusion, to highlight the importance of EDI for the School Support for the establishment of a 'postdoc society'. This was highlighted during the School's Athena SWAN application process. A key objective of the activity is to enable sharing of experiences, grant application writing and other activities supporting early career development and personal development.
Natural Sciences	 E3 Teaching Committee and New Course Development: As part of the rolling out of the E3 initiative, Natural Science has been involved in discussions relating to building new masters offerings. As part of these, we have also engaged in substantive review of our existing courses. One particular area of quality concern has been ensuring that adequate module sharing happens across programmes to best facilitate inter-disciplinary learning. Course director of Biodiversity and Conservation Practise has worked with Disability Officers and Occupational Therapists to ensure that the learning experience of a student requiring some specific processes to be put in place were met. In particular, this involved spreading he modules over two years, an approach which could benefit other students in future years. The new CHARM-EU MSc in Global Sustainability Challenges has established mentors for the students enrolled on the programme. They evaluate the students' electronic portfolios and give them advice on how to improve. The MSc is in its first year, so evaluation will follow. The TOR for the UG Teaching and Learning Committee have been revised following considerable discussion and approved by the School Executive. These allow for greater clarity of lines of reporting and programme development.

Faculty of STEM Schools	Please outline here three quality initiatives undertaken by the School in 2020/21 that you wish to showcase as good practice/enhancement activities.
Physics	 A new, user-friendly online module and lab assessment form was created and deployed in Blackboard, to try to reduce the barrier to students to submitting surveys. Nonetheless, we have concluded that due to online survey overload for students, set-aside class time for paper survey completion is necessary. The role of Year Head has been better defined and re-energised within the School of Physics, in order to mitigate any communication deficit for students due to online study and also for staff, in terms e.g. of the timing of continuous assessment deadlines. The Year Head delivers a comprehensive overview and Q&A meeting at the start of the year, and a complete plan of lectures and deadlines to help students manage their workload. In order to help mitigate disruption for JF students due to online teaching and also due to prior disruptions that many students faced at secondary level, we have restructured our JF tutorials as now being directly associated with lecture courses, with new 'scaffold' problem solving material for students.
Biochemistry & Immunology	 Use of innovative teaching methods including 'flipped classroom' and 'peer-led learning' approaches for the teaching of Biochemistry (lectures & practicals) in the 2nd year. This, together with the invaluable contribution of student to student (S2S) teaching (financially supported by the School, has led to a significant improvement in student engagement and results. The introduction of online pre-practical videos/demonstrations for 2nd year Biochemistry practicals. Since 20% of all Trinity undergraduate students take practical classes in our School, our innovations in delivery of practical teaching have a broad positive impact across the University by enhancing hands-on expertise in the design and execution of experiments across a range of students in STEM. A new approved module in Molecular Nutrition to be offered to 2nd year Biological and Biomedical Sciences students (from 2020) to enhance their knowledge of Biochemistry related to nutrition. This development is a response to a demand from non-EU (from the US) students for additional high quality and comprehensive Biochemistry teaching.

Please outline any quality issues that fall outside the remit of the School for escalation to Faculty or College-level				
• Estates and Facilities review of teaching spaces, e.g. acoustics in Goldsmith Hall, ventilation in Museum Building.				
 Review of plagiarism procedures by Senior Lecturer / Dean of Graduate Studies. The procedure, especially at UG level, is too cumbersome. 				
 The short examination period puts the students (especially JS/SS) under considerable stress with many having 4 exams and some having up to 7 exams over a 5-day period. This was something they raised with the external examiners who flagged it in their reports 				
 Having to draft papers for the extra deferred exam sessions that the SL introduced placed a huge administrative burden on both academic and admin staff as well as on the external examiners who had to review moderatorship papers. The continuation of this practice into the 2021/22 academic year has lead to non-stop exam preparation for 9 months of the year and admin staff having to monitor exams in the evenings and at weekends. Consideration of staff should also be taken into account when such decisions are being made 				
 The timing of the reassessments and their short turnaround time negatively impacts on JS students who have issues with TE selections and their moderatorship allocation (they find out the course they have been assigned to the Friday before a Monday start) 				
 The recruitment and retention of external examiners is increasingly problematic. Workloads have increased dramatically during the pandemic and colleagues are less willing to take on additional duties. This has not been helped by the proliferation of exam sessions and deferrals for which their input is needed. In addition, the administrative overhead they face applying for a PPS number is a disincentive given the small fee they receive. This issue is restricting the pool of candidates that are willing to do the job (the school has almost always had external examiners from outside Ireland). Ongoing timetabling difficulties within the TEP architecture are forcing the school to reconsider its degree offerings. 				
The school requests that the HR processes for recruiting and retaining staff he reviewed. Failure to retain and train				
staff impacts teaching and research. There are numerous pitfalls with the current HR process as it results in slow replacement of retiring, resigning staff and maternity leave cover.				

Faculty of STEM Schools	Please outline any quality issues that fall outside the remit of the School for escalation to Faculty or College-level				
Computer Science and Statistics	 The School wishes once again to highlight the ongoing delays encountered due to the approval and recruitment processes for both academic and non-academic staff. In 2019/20 the School sought to fill 12 new and replacement academic positions. The corresponding figure today is 11 even though 5 new appointments were made during this period. Limited promotional opportunities are hampering our ability to retain staff which is exacerbated by the speed of the hiring process. Given increased demand for places in SCSS, this has the potential to significantly impact upon our ability to deliver existing and future programmes to the exacting standards that we have previously delivered. The availability of adequate, preferably contiguous, space continues to pose serious difficulties for the School. Insufficient and inappropriate space will degrade the ability of the School to recruit and retain increased PhD and Postdoctoral numbers. The School was expecting to move to the contiguous space vacated by Trinity Research & Innovation (TR&I) in Westland Row, but this has been further delayed pending the identification of alternative space for TR&I. The opening of the E3 Learning Foundry is also delayed due to the pandemic but will provide vital state-of-the-art teaching facilities when complete. The School seeks clarity and resolution of the difficulties preventing well qualified postdoctoral staff from undertaking teaching and supervision duties in the School. Students would benefit greatly from exposure to the work of the post-doctoral staff and many such staff are keen to gain essential teaching experience to advance their academic careers. 				
Genetics and Microbiology	 There is currently no finance from the College to support SS capstone research projects which in STEM, if wet laboratory based, can cost a few thousand euro per student. At present, these projects are inappropriately funded via PI research grants. There should be a clear financial structure to support the SS capstone research project, a key selling point of our UG degrees. It is proposed that student numbers in Trinity College increase. Although predominantly at a PG level, if this results in extra UG student numbers, which is being considered given various pressures, it will put the SS capstone research projects in STEM under serious threat and undoubtedly the quality of SS research projects will be greatly impacted. Furthermore, in the JF and SF years, the lecture theatres and laboratory spaces would have to be upgraded to accommodate such increases in UG student numbers. Indeed, such upgrades should be undertaken even with current UG student numbers to provide an excellent student experience in STEM. Given the Covid-19 pandemic the process of hiring staff became more cumbersome, and indeed, the School was without a School Manger from March 2020. Note, we have a new School Manager starting in March 2022. Timely and smooth pathways to enable replacement of retiring academic and professional staff will be essential moving forward. Maintaining student:staff ratios, and where possible lowering ratios, will be essential to maintaining the quality of the student education and experience in Trinity. 				

Biochemistry & Immunology	 Through the ADUSE and the Stream director of the Biological and Biomedical Sciences stream it has been proposed that the CAO numbers for 2022/23 will return to 2019/20 levels however our ability to support increasing numbers of senior sophister and MSc projects without a growth in staff numbers is limited. The quality of the 'capstone' projects carried out by our SS students has been highlighted by our external examiners but maintaining this in an environment of increasing student numbers and insufficient grant funding (to support PhD students and postdocs who engage directly with the 10 students) is a major and growing constraint. Clearly the ambition of the college as articulated in the Strategic Plan to reduce the student staff ratio to 16:1 could mitigate this risk if new staff can be appointed in the School.
	 Capacity to grow. We are currently at capacity regarding space occupancy within TBSI. Many of our staff share offices which can impact on their engagement with students through tutorials and other small group activities. Further growth would require College to allocate additional space to the School within TBSI.
Physics	 Actions of the CTU (Central Timetabling Unit) have caused a deal of disruption for the School and have led to an unwieldly a timetable that is not student friendly. In particular the decision not to rollover the F2F timetable database for 2020/21 that had been especially prepared (but not used in 2020/21) to facilitate the return to F2F teaching in 2021/22 impacted the SoP. Instead, the COVD timetable (with all F2F events removed) was rolled over leading to a scramble for rooms and slots. THE CTU had first call on this new timetable. In a further move the CTU scheduled Maths lectures shared with JH courses for Theoretical Physics students without any reference to the science timetables. This led to knock on affects – again leading to an unwieldy timetable. AR can enhance the competence of handling non-routine PGR registration (e.g. retrospective case) and improve the communication/clarify of routine procedures to the School. The recent nomination of the external examiner of the Energy Science MSc taught programme was rejected. As the student cohort is expanding, the course needs to appoint an external examiner to review and improve its program. The ES MSc has a 300hr contact hour and this applies excessive pressure on academic. With increasing student number, further expansion and sustainability of the course should be reviewed properly to ensure the quality. The lack of admin support in 2020/21 increased the workload of course management team (for example the course director need to do timetabling).

Appendices

Appendix A: Retention by standing and Faculty

Standing & Retention	STEM	%
1	965	26.97%
Progressed Same Course	872	90.36%
Repeat Same Course	20	2.07%
Transferred to Another Course	29	3.01%
Not Retained	44	4.56%
2	848	23.70%
Course Completed-Exit Award		0.00%
Progressed Same Course	798	94.10%
Repeat Same Course	14	1.65%
Transferred to Another Course	20	2.36%
Not Retained	16	1.89%
3	819	22.89%
Course Completed		0.00%
Progressed Same Course	786	95.97%
Repeat Same Course	14	1.71%
Transferred to Another Course	10	1.22%
Not Retained	9	1.10%
4	776	21.69%
Course Completed	477	61.47%
Course Completed-Exit Award	113	14.56%
Progressed Same Course	168	21.65%
Repeat Same Course	4	0.52%
Transferred to Another Course	2	0.26%
Not Retained	12	1.55%
5	170	4.75%
Course Completed	169	99.41%
Repeat Same Course		0.00%
Not Retained	1	0.59%

Grand Total	3578	100.00%
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				STEM
	S	TEM		Total
Standing & Retention	Female	Male	Null	
1	420	542	3	965
Progressed Same Course	385	484	3	872
Repeat Same Course	5	15	0	20
Transferred to Another Course	15	14	0	29
Not Retained	15	29	0	44
2	338	510		848
Course Completed-Exit Award				
Progressed Same Course	324	474	0	798
Repeat Same Course	3	11	0	14
Transferred to Another Course	4	16	0	20
Not Retained	7	9	0	16
3	319	500		819
Course Completed				
Progressed Same Course	314	472	0	786
Repeat Same Course	3	11	0	14
Transferred to Another Course	1	9	0	10
Not Retained	1	8	0	9
4	310	466		776
Course Completed	233	244	0	477
Course Completed-Exit Award	18	95	0	113
Progressed Same Course	57	111	0	168
Repeat Same Course	0	4	0	4
Transferred to Another Course	0	2	0	2
Not Retained	2	10	0	12
5	40	130		170
Course Completed	39	130	0	169
Repeat Same Course	0	0	0	

Appendix B: UG Student Body by Faculty & Gender (n)

Not Retained	1		0	1
Grand Total	1427	2148	3	3578

				STEM
		STEM		Total
Standing & Retention	Female	Male	Null	
1	29.4%	25.2%	100.0%	27.0%
Progressed Same Course	91.7%	89.3%	100.0%	90.4%
Repeat Same Course	1.2%	2.8%	0.0%	2.1%
Transferred to Another Course	3.6%	2.6%	0.0%	3.0%
Not Retained	3.6%	5.4%	0.0%	4.6%
2	23.7%	23.7%	0.0%	23.7%
Course Completed-Exit Award	0.0%	0.0%	0	0.0%
Progressed Same Course	95.9%	92.9%	0	94.1%
Repeat Same Course	0.9%	2.2%	0	1.7%
Transferred to Another Course	1.2%	3.1%	0	2.4%
Not Retained	2.1%	1.8%	0	1.9%
3	22.4%	23.3%	0.0%	22.9%
Course Completed	0.0%	0.0%	0	0.0%
Progressed Same Course	98.4%	94.4%	0	96.0%
Repeat Same Course	0.9%	2.2%	0	1.7%
Transferred to Another Course	0.3%	1.8%	0	1.2%
Not Retained	0.3%	1.6%	0	1.1%
4	21.7%	21.7%	0.0%	21.7%
Course Completed	75.2%	52.4%	0	61.5%
Course Completed-Exit Award	5.8%	20.4%	0	14.6%
Progressed Same Course	18.4%	23.8%	0	21.6%
Repeat Same Course	0.0%	0.9%	0	0.5%
Transferred to Another Course	0.0%	0.4%	0	0.3%
Not Retained	0.6%	2.1%	0	1.5%
5	2.8%	6.1%	0.0%	4.8%
Course Completed	97.5%	100.0%		99.4%
Repeat Same Course	0.0%	0.0%		0.0%

Appendix C: UG Student Body by Faculty & Gender (%)

Not Retained	2.5%	0.0%		0.6%
Grand Total	100.0%	100.0%	100.0%	100.0%

			STEM
	STE	Μ	Total
Standing & Retention	EU	NEU	
1	882	83	965
Progressed Same Course	795	77	872
Repeat Same Course	18	2	20
Transferred to Another Course	27	2	29
Not Retained	42	2	44
2	795	53	848
Course Completed-Exit Award			
Progressed Same Course	746	52	798
Repeat Same Course	13	1	14
Transferred to Another Course	20	0	20
Not Retained	16	0	16
3	770	49	819
Course Completed			
Progressed Same Course	739	47	786
Repeat Same Course	14	0	14
Transferred to Another Course	10	0	10
Not Retained	7	2	9
4	718	58	776
Course Completed	463	14	477
Course Completed-Exit Award	93	20	113
Progressed Same Course	152	16	168
Repeat Same Course	2	2	4
Transferred to Another Course	1	1	2
Not Retained	7	5	12
5	164	6	170
Course Completed	164	5	169
Repeat Same Course			

Not Retained		1	1
Grand Total	3329	249	3578

Appendix E: Faculty STEM by Programme

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Programme	Retention			1					2				3			4				5	Total		
		Fe	male	N	lale	Null	Fer	nale	M	ale	Fer	nale	N	lale	Fei	nale	Μ	lale	Fe	male	N	lale	
		EU	NEU	EU	NEU	EU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	EU	NEU	
Biological and Biomedical Sciences	Progressed Same Course	155	23	58	5	0	131	16	69	2	138	9	79	4	0	0	0	0	0	0	0	0	689
	Repeat Same Course	3	0	0	0	0	0	0	0	0	1		1		0	0	0	0	0	0	0	0	5
	Transferred to Another Course	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
	Not Retained	9	0	2	0	0	3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	15
Chemical Sciences	Progressed Same Course	37	3	25	0	1	31	1	23	1	32		22	0	0	0	0	0	0	0	0	0	176
	Repeat Same Course	1	0	0	0	0	0	0	1	0	0	0	1		0	0	0	0	0	0	0	0	3
	Transferred to Another Course	4	0	1	0	0	4	0	6	0	0	0	2	0	0	0	0	0	0	0	0	0	17

	Not Retained	3		5			2		2		1		2		0	0	0	0	0	0	0	0	15
Chemistry with Molecular Modelling	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
Computer Science	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	23	1	27
	Course Completed- Exit Award	0	0	0	0	0	0	0	0	0	0	0	0	0	6		40	2	0	0	0	0	48
	Progressed Same Course	18	3	61	17		14	6	66	11	6	0	73	8	7	2	24	2	0	0	0	0	318
	Repeat Same Course	1		5	1	0	0	0	3		1	0	0	0	0	0	1	1	0	0	0	0	13
	Transferred to Another Course	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3
	Not Retained	0	0	4	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Computer Science and Language	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	3	0	0	0	0	0	9

	Progressed Same Course	4		11	1	0	5	0	8	0	2	0	2	0	0	0	0	0	0	0	0	0	33
	Repeat Same Course	0	0	3	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	5
	Transferred to Another Course	0	0	5	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	8
	Not Retained	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Earth Sciences	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	4						14
Engineering	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0		0			31	2	94	2	129
	Course Completed- Exit Award	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	33	18	0	0	0	0	62
	Progressed Same Course	57	5	117	13		46	4	135	3	49	7	132	14	39	2	69	8	0	0	0	0	700
	Repeat Same Course	0	0	2	1	0	0	0	3	0	0	0	4	0	0	0	0	1	0	0	0	0	11

	Transferred to Another Course	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
	Not Retained	1	0	7	1	0	1	0	0	0	0	0	1	2	0	0	3	5	0	0	0	0	21
Engineering - Double Diploma	Progressed Same Course	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	Not Retained	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Engineering with Management	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3		10	0	13
	Course Completed- Exit Award	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	3
	Progressed Same Course	6		20	1		6		20	1	6	1	19	1	5	1	8	0	0	0	0	0	95
	Repeat Same Course	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	Transferred to Another Course	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1

	Not Retained			3									1	0	0	0	0	0	0	0	0	0	4
Geography and Geoscience	Progressed Same Course	22	2	30		1	25		21		21	1	19	0	0	0	0	0	0	0	0	0	142
	Repeat Same Course	0	0	0	0	0	0	0	0	0	1		1	0	0	0	0	0	0	0	0	0	2
	Not Retained	1	0	1	0	0	1		1	0	0	0	1	0	0	0	0	0	0	0	0	0	5
Human Genetics	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	1	0	0	0	0	0	11
Management Science and Information Systems Studies	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	22	0	0	0	0	0	26
	Progressed Same Course	15	1	14	1		15	1	19	2	7		19	0	0	0	0	0	0	0	0	0	94
	Repeat Same Course	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Not Retained	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Mathematics	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	28	0	0	0	0	0	34
	Progressed Same Course	8	1	34	0	1	6	0	27	0	10	0	14	0	0	0	0	0	0	0	0	0	101
	Repeat Same Course	0	0	2	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	5
	Transferred to Another Course	0	0	2	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	7
	Not Retained	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Medicinal Chemistry	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	14		7	0	0	0	0	0	21
Nanoscience, Physics and Chemistry of Advanced Materials	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	21	0	0	0	0	0	26
Physical Sciences	Progressed Same Course	18		41			11	2	36	2	18		30	1		0	0	0	0	0	0	0	159
	Repeat Same Course	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	3

	Transferred to Another Course	2	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	Not Retained	1	0	2	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	6
Science	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	163	11	129	3	0	0	0	0	306
	Not Retained	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	3
Theoretical Physics	Course Completed	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	25	0	0	0	0	0	28
	Progressed Same Course	6	1	35	0	0	4		28		7		34	1	0	0	0	0	0	0	0	0	116
	Repeat Same Course	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	Transferred to Another Course	0	0	5	0	0	0	0	4	0	0	0	3		0	0	0	0	0	0	0	0	12
	Not Retained	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Grand Total		379	41	500	42	3	307	31	488	22	301	18	469	31	293	17	425	41	37	3	127	3	3578