

ANNUAL REPORT

2020-2021



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VISION

A beacon of scientific innovation, a host to a vibrant and creative scientific community, and a source of scientific solutions to the UAE and beyond.

MISSION

The college aims to nurture an innovative scientific environment that is inspiring to students, attractive to talented faculty, and conducive to a strong partnership with the community and industry.

DEAN'S MESSAGE



The ongoing COVID-19 global pandemic made the 2020-2021 an academic year with unique trials and challenges. First, we had to think of long-term solutions that kept the faculty, researchers, and students engaged and motivated in the face of the prolonged work-from-home mandate. Second, we had to transform courses to be suited for online platforms. Additionally, as a college of science, we insisted on maintaining laboratory courses as face-to-face classes, while ensuring the safety of both faculty and students. This determination was to guarantee hands-on experience that is crucial for the success of our students.

The College of Science has also worked hard on improving the educational pathway of its students regardless of the challenges caused by distance learning. The College was able to develop a program that equips its students with necessary skills for the job market, while also enhancing the opportunity of its honor students to pursue graduate studies.

The pandemic not only disrupted our way of teaching but also interrupted access to research labs. This impacted how our scientists, their research assistants, and graduate students could perform research activities. Yet, this year, the College of Science was the most productive college in the whole university in terms of research productivity. Our researchers were able to achieve, on average, 4 published papers per faculty, where 2 of these 4 papers were in the top 25% international journals. The College of Science also kept graduating its MSc and PhD students while moving forward

with its research collaboration agenda. Important collaborative grants with international reputable institutions, such as the University of California Berkeley and the Chinese Academy of Sciences, were awarded. Furthermore, our scientists have been at the forefront in providing insights and guidance to the country on how to deal with the pandemic through their expertise in epidemiology.

We discovered during the pandemic the resilience of our faculty, staff, students and their quick and rigorous adaptation to the new reality. They were successfully able to turn the situation to the advantage to achieve the College's mission and objectives. We also recognize and appreciate the psychological effects that this pandemic has left on our community. Colleagues who have lost their loved ones and could not be at their side to utter the last words to them and had to grieve alone from a distance. Students who have joined the university for the first time may not have been fully aware about whom to turn to in times of frustration when they needed most guidance and consolation.

With all of this, the pandemic experience has left unique and lasting effects on our personal and academic lives. It has imparted us with a strong will and new ways to forge ahead with our academic and scientific agenda and encouraged us to discover new horizons and seize opportunities that will be of great benefit for our students, faculty, and university.

Prof. Maamar Benkraouda
Dean, College of Science

EXECUTIVE SUMMARY

The College of Science started implementing the new 2021-2023 strategic plan during the 2020/2021 academic year.

Based on this strategy, the College has 4 priorities:

1. Student Readiness Journey,
2. World Class Programs,
3. Research Productivity and Output, and
4. Partnerships with industry and governmental entities.

More than sixty initiatives and activities were selected carefully to enhance the college's role in these areas. Although it is only the first year of the plan, COS showed a strong start in implementing the new strategy.

Several faculty received recognition awards.

Impactful COVID-19 teaching, research and service contributions.

The Meta Excellence Program was launched in collaboration with the Science and Innovation Park.

Physics programs received international accreditation from ABET.

COS leads in research productivity among all UAEU colleges with 4 research papers per faculty member.

Excellent examples of international research collaborations.

THE COLLEGE



COLLEGE ADMINISTRATION



College Advisory Board — **Prof Maamar Benkraouda** Dean — Office of the Dean

Office of the Dean
 Senior Administrator (1)
 Administrator (1)
 Service Assistant (1)



Dr Asma Al Menhali
 Vice Dean



Dr Sulaiman Ali Alkaabi
 Asst. Dean (Student Affairs)

Academic Advisor-I (1)
 Academic Advisors (2)
 Secretary (1)
 Administrator (1)



Dr Ruwaya Alkendi
 Asst. Dean (Research & Graduate Studies)

Administrator (1)
 MSc Coordinators (6)
 PhD Coordinator(1)



Dr Khaled Amiri
 Head, Department of Biology

Administrator (1)



Dr Mohamed Alazab
 Head, Department of Chemistry

Administrator (1)



Prof Hasan Arman
 Head, Department of Geology

Administrator (1)



Dr Adama Diene
 Head, Department of Mathematical Sciences

Administrator (1)

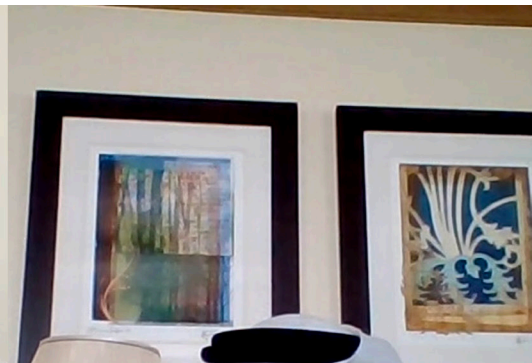


Prof Usama Al Khawaja
 Head, Department of Physics

Administrator (1)

ADVISORY BOARD

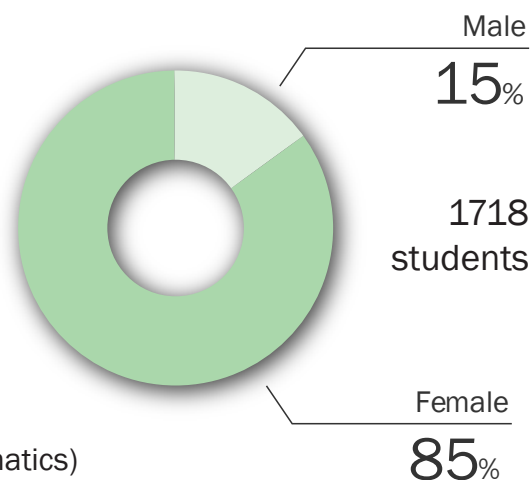
#	Name	Affiliation
1	Mr. Sultan Al Hajji	President, Alliance Francaise Abu Dhabi; Chairman of the Advisory Board, College of Science, UAEU; Expert of Partnership, UAEU
2	Eng. Suhail Thani Al Muhairi	Infrastructure & Services Coordination Division Manager, Municipalities and Transport Department, Al Ain Municipality
3	Dr. Mohamed Murad Abdulla	Director of Decision Support Center, Dubai Police
4	Mr. Saeed Mohammed Al Muhairi	Executive Director, Emiratis Metrology Institute (EMI), Abu Dhabi Quality Conformity Council (QCC)
5	Ms. Sheikha Al Maskari	Communications Advisor, Founding member of UAE Space Agency and Chief Innovation Officer
6	Mr. Salem Rashed Almatrooshi	Retired from ADNOC
7	Ms. Aayda Al Shehhi	Director, Radiation Safety, Federal Authority for Nuclear Regulation
8	Dr. Abdulla Ahmed Al Mandous	Executive Director, National Center of Meteorology



STUDENT READINESS JOURNEY



UNDERGRADUATES



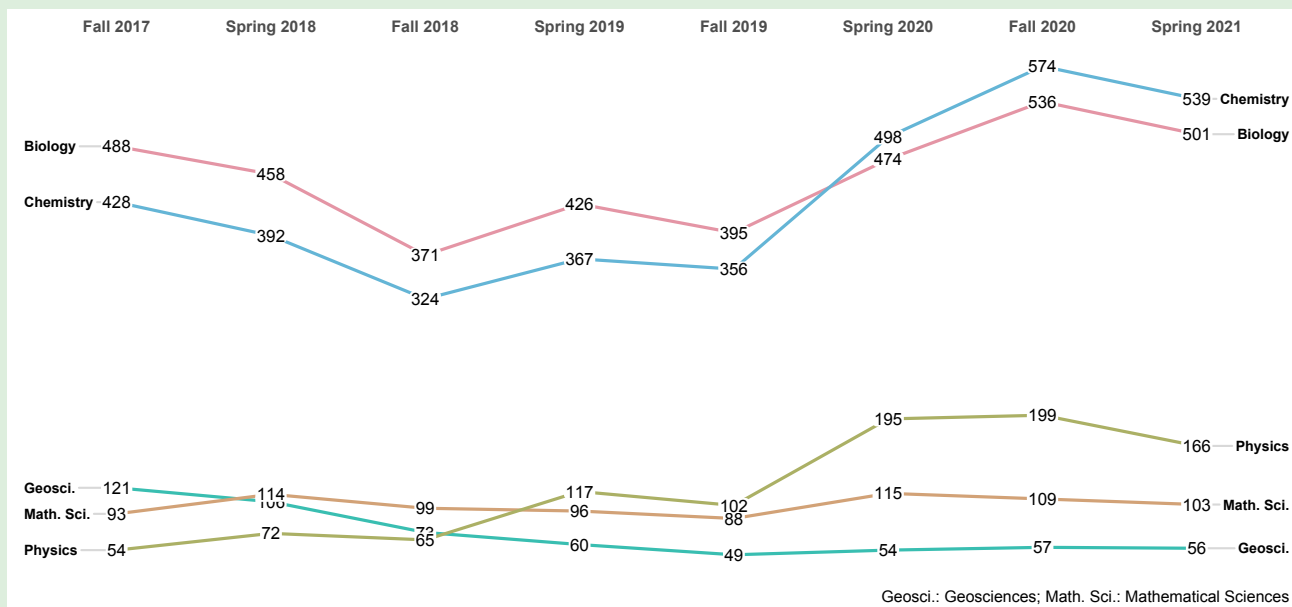
5 Departments and 8 programs

1. Biology: BSc (Biology)
2. Chemistry: BSc (Chemistry), BSc (Biochemistry)
3. Geosciences: BSc (Geosciences)
4. Mathematical Sciences: BSc (Mathematics), BS-MS (Mathematics)
5. Physics: BSc (Physics), BS-MS (Physics)

Undergraduate by discipline (Spring 2021)



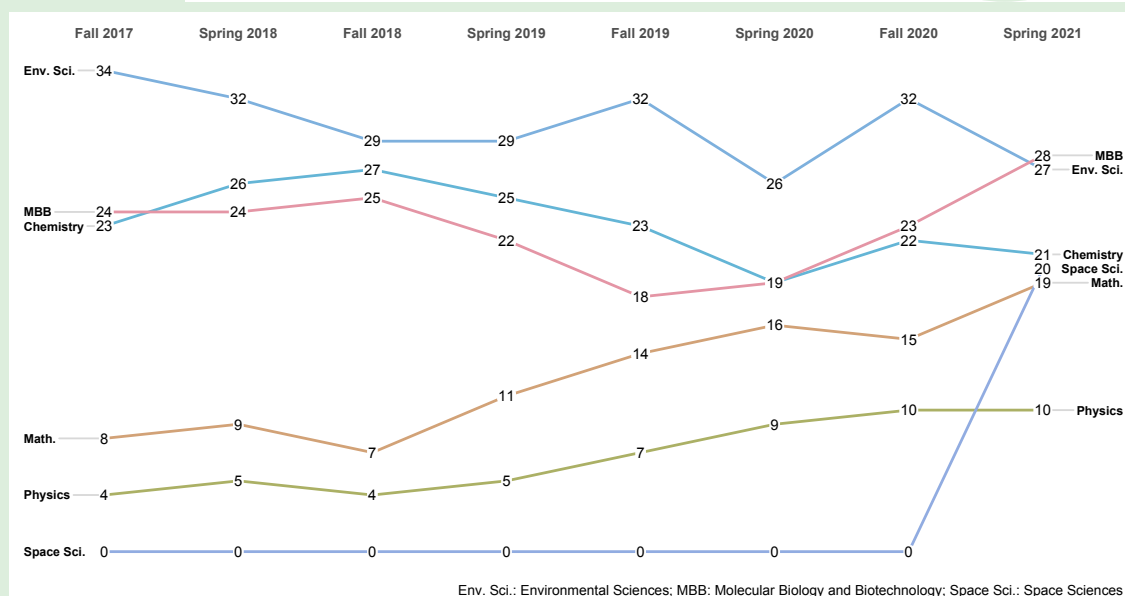
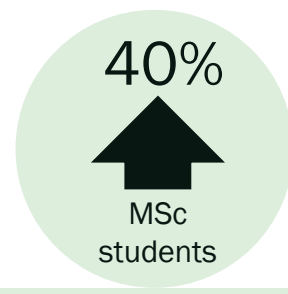
Undergraduate student trend



GRADUATE PROGRAMS

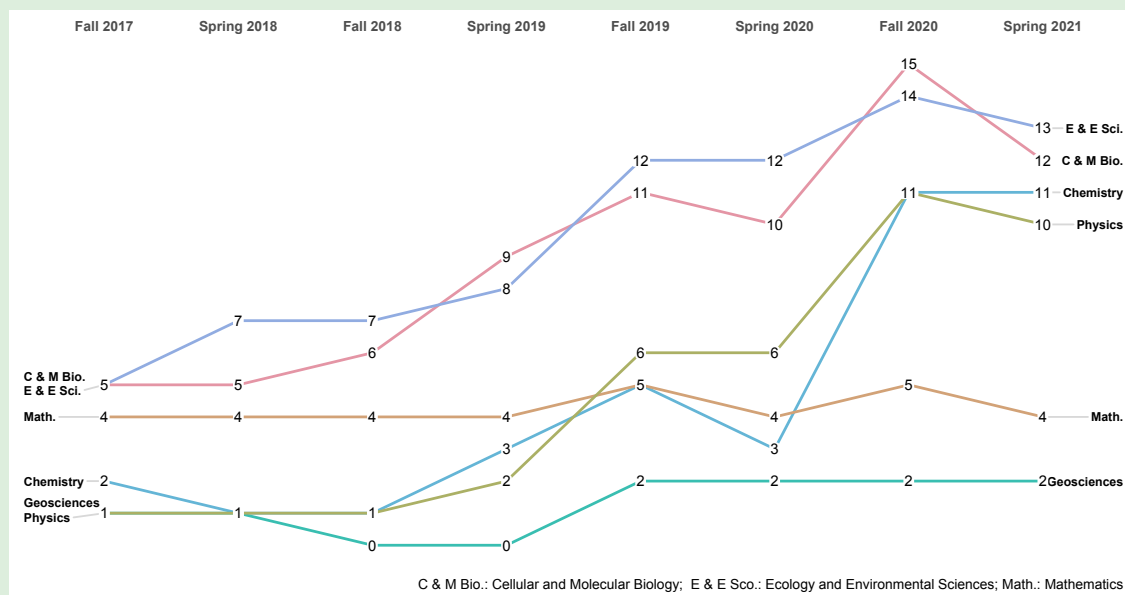
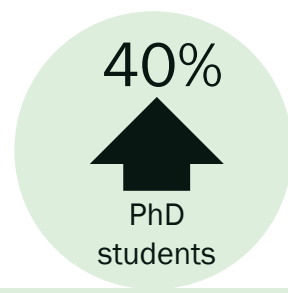
6 Masters (MSc) Programs

1. Molecular Biology & Biotechnology
2. Environmental Sciences
3. Chemistry
4. Mathematics
5. Physics
6. Space Science



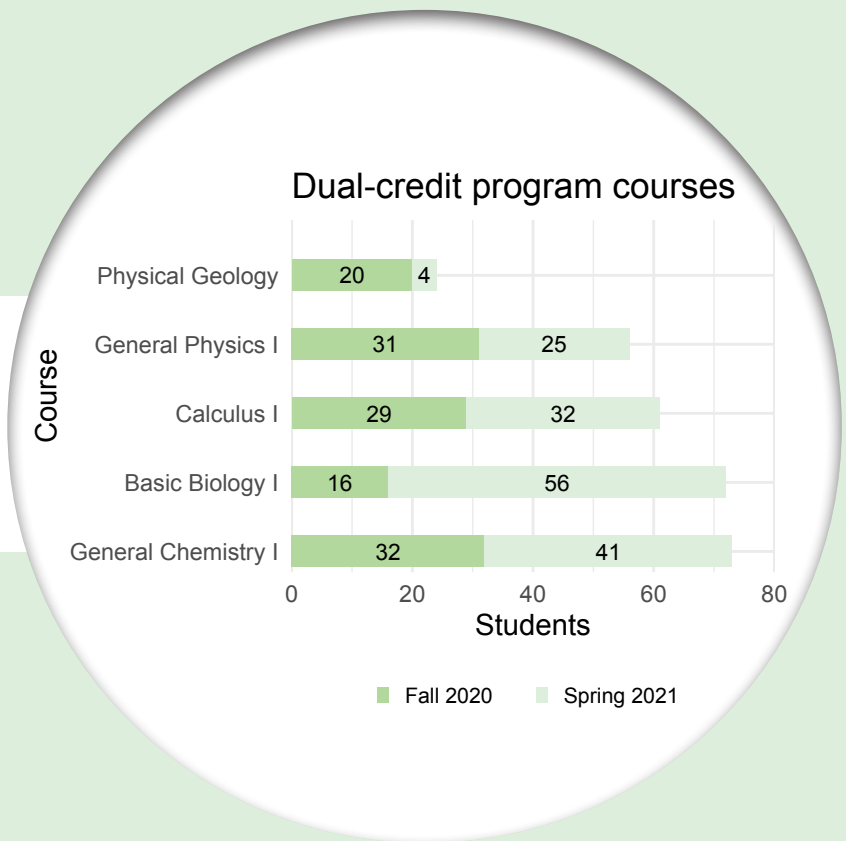
6 PhD Programs

1. Cellular & Molecular Biology
2. Ecology & Environmental Sciences
3. Chemistry
4. Geosciences
5. Mathematics
6. Physics



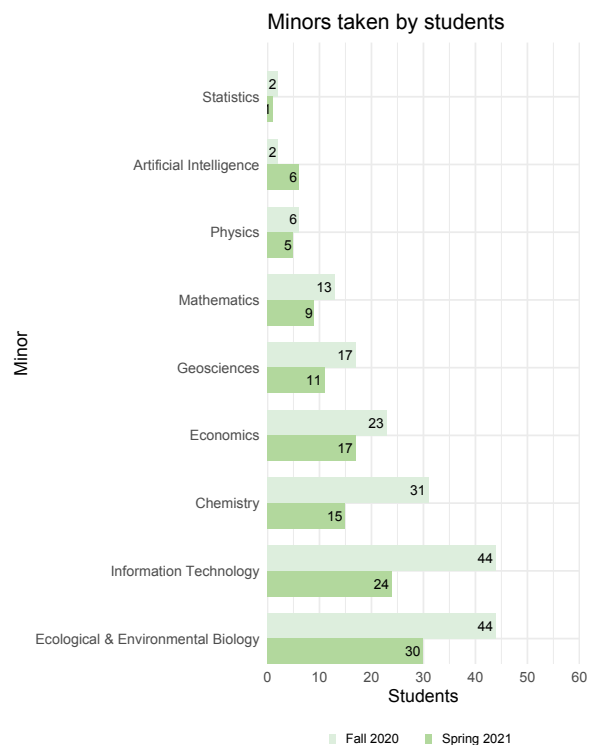
DUAL-CREDIT PROGRAM

In cooperation with the Ministry of Education, the College has introduced the dual-credit program, an important initiative that will attract more talented high-school students to take courses from the COS.



Minor

COS students have the opportunity to take few minors in different colleges that gives, besides their major in science, an advantage to our students in the job market. The figure to the right shows the minors that our students have taken within and outside the COS.



CAREER-ORIENTED PROGRAMS & INITIATIVES

Meta Excellence Program

This program is offered to COS students through UAEU's Science and Innovation Park (SIP). The program's objectives are:

- To help students find a meaningful job in their field of interest or to create their own job through entrepreneurial training.
- To improve students soft-skills and to help them have a clearer career vision aligned with their personal purpose
- To secure meetings with external mentors to build their career roadmap

The program has 4 training phases: Mindset Shift, Private Sector Engagement, Focused-Track Employment or Entrepreneurship, and Incubation & Acceleration.



Meta Excellence Program

A Program offered by UAEU SIP to College of Science Students



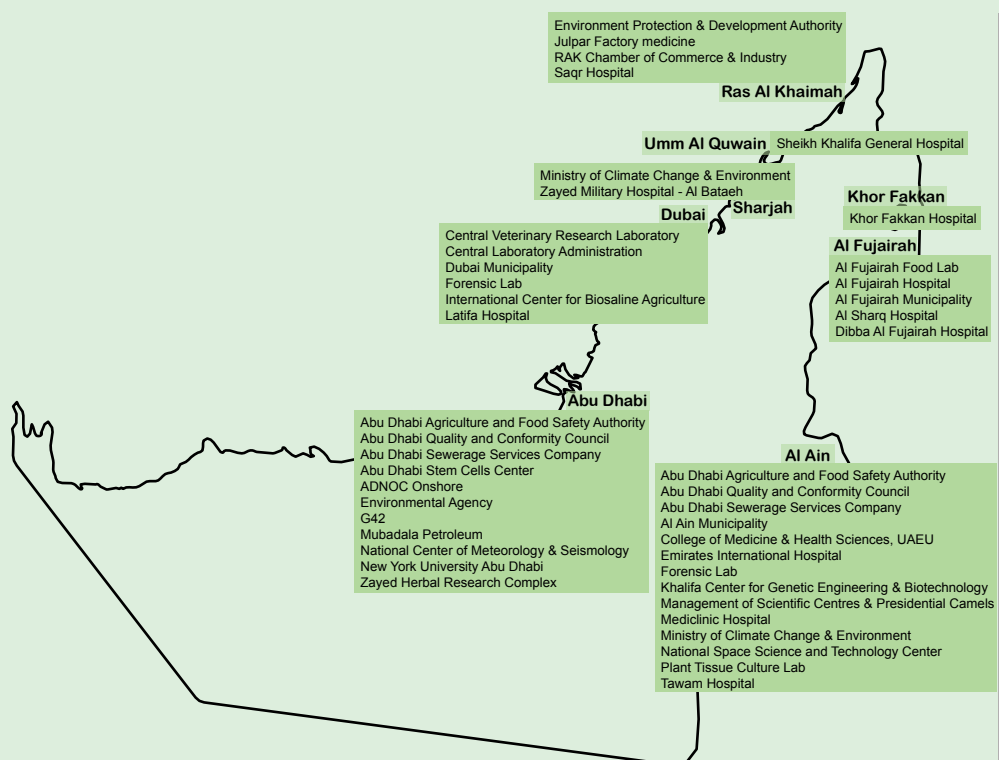
HONORS PROGRAM

Honors Program

The COS Honor Students program was established in Spring 2021 to provide students with the necessary skills to get admitted to well-known graduate schools. There are 297 honors students enrolled in this program currently. A Students Council from these students has been elected to run this program.

Internships

Despite the challenges imposed by COVID-19, 190 senior students secured internships at several different governmental and private entities across the nation.








WORLD CLASS PROGRAMS



ACCREDITATION

The COS takes many steps to provide its students with world-class programs. All of the current programs are either accredited (locally and/or internationally) or in the process of accreditation.

COS' undergraduate programs have been accredited by international bodies or are in the process of obtaining international accreditation.

Program	Accreditation Body	Duration	Application or renewal planned
BSc (Biology)		2019-2024	2024
BSc (Chemistry)		2016-2020	2021
	 Canadian Society for Chemistry <i>For Our Future</i> Société canadienne de chimie <i>Pour notre avenir</i>	2017-2022	2022
BSc (Biochemistry)	 Canadian Society for Chemistry <i>For Our Future</i> Société canadienne de chimie <i>Pour notre avenir</i>	2017-2022	2022
BSc (Geosciences)			2022
BSc (Mathematics)			2022
BSc (Physics)	 ABET	Applied and Natural Science Accreditation Commission	2020-2026

FUTURE-ORIENTED PROGRAMS

BSc Data Science

The Department of Mathematical Sciences worked to initiate a BSc Data Science Program. The proposed program is a new, multidisciplinary academic program, jointly hosted by the Department of Mathematical Sciences of the COS and the College of Information Technology at UAEU. This will be a first of its kind in the Middle Eastern region. Graduates of the program may pursue a number of careers including AI Engineer, Business Intelligence Developer, Machine Learning Engineer, AI and Big Data Analyst and AI and Data Architects, and Research Scientists.

MSc track in Quantum Computing

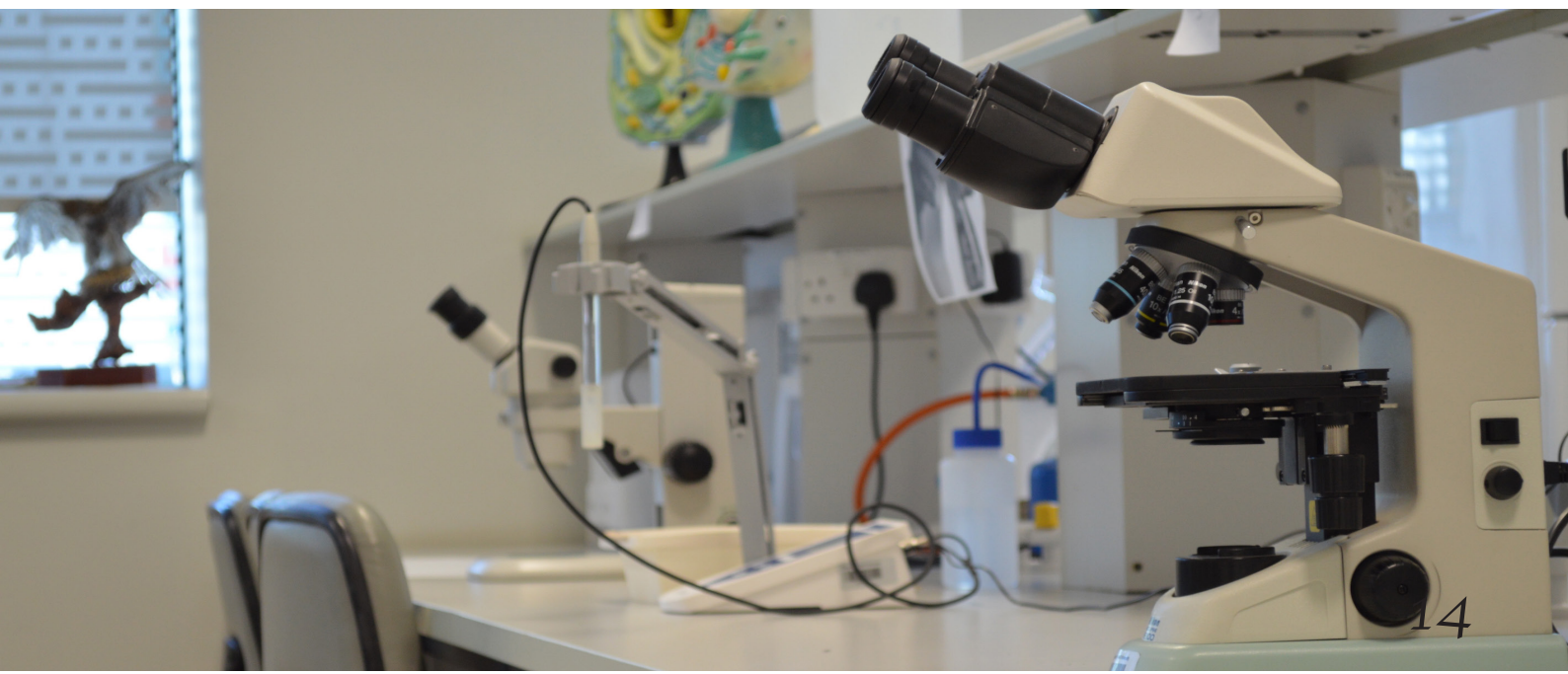
The COS, represented by the Dean, and the Department of Physics, have started discussing with the Dean of the College of Information Technology (CIT) forming a program in quantum information.

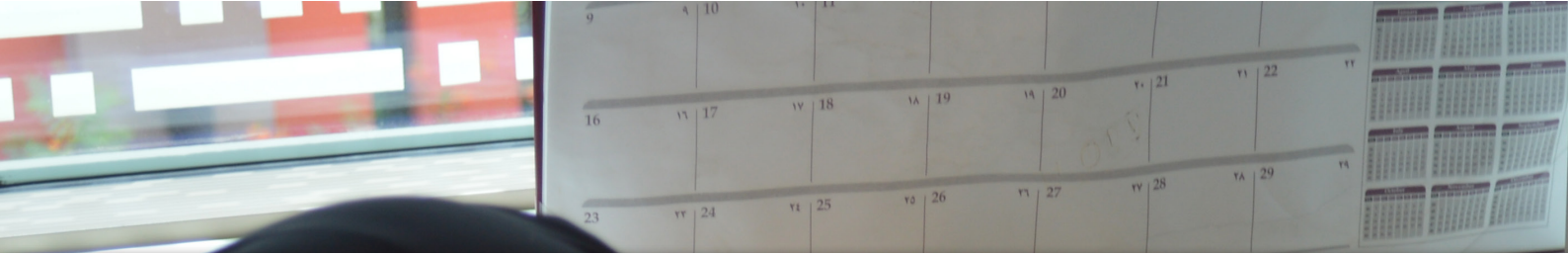
MSc in Forensic Science

The COS is evaluating the possibility of introducing a new Master's program in Forensic Science. A pre-proposal that includes a feasibility study to ensure COS readiness and an assessment of the market need for such a program has been prepared. The program will be designed to introduce students to forensic science and its interdisciplinary nature through exploration and examination of forensic sub-disciplines and emerging techniques including DNA forensics and forensic chemistry, among others.

MSc in Advanced Materials

The COS is proposing the initiation of a MSc program in "Advanced Materials". The objective of the proposed program is to provide high-level education on basic and applied science of materials with energy, environmental, biomedical, electronic and computational applications.





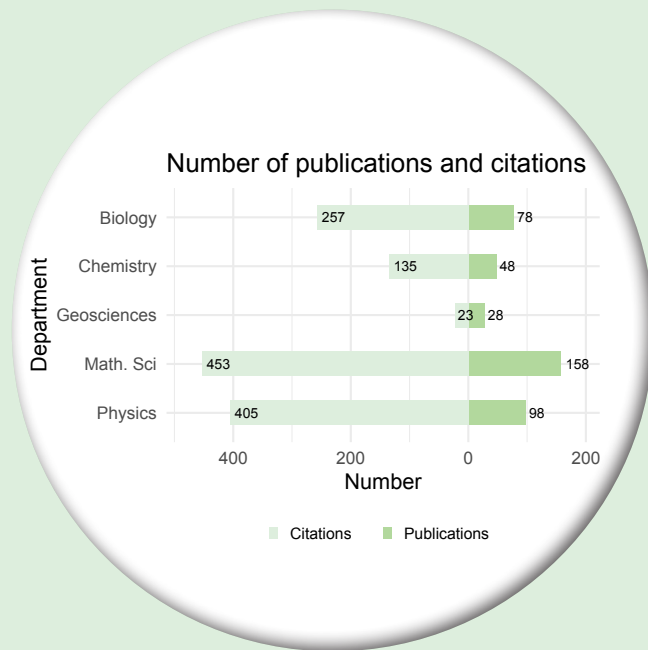
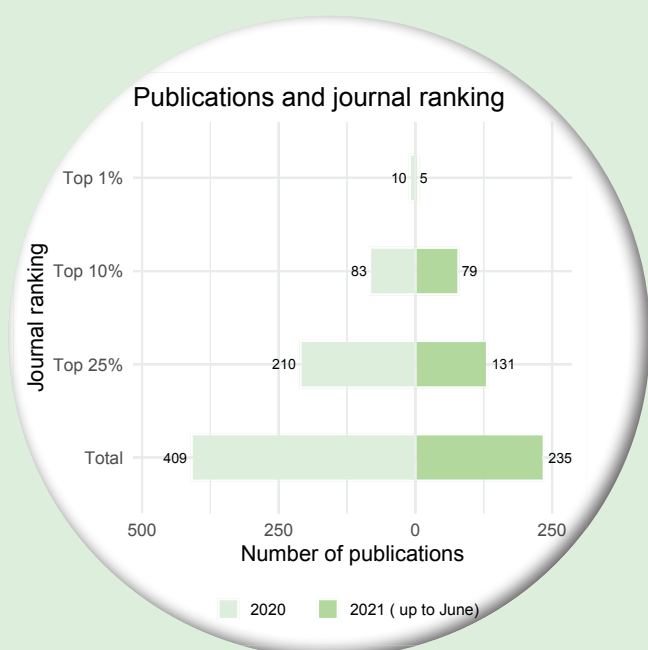
IMPACTFUL RESEARCH



RESEARCH PRODUCTIVITY

Publications

Despite the impact that COVID-19 has had in the last academic year, in 2020, the COS produced the highest number of research papers among all the colleges of UAEU with an average of 4 papers per faculty. Furthermore, 51.3% of a total of 409 publications were published in the top 25% journals.



Research Funding

This year, faculty members from the College has successfully managed to procure several new grants including external grants. Ongoing and new grants now total 32 with research funds exceeding AED 21 million.

Type	Number	Amount (AED)
Start-up grant	2	800,000
University Program for Advanced Research	17	7,515,185
Strategic Research Program	4	2,000,000
Collaborative Research (Asian Universities Alliance, Chinese Academy of Science)	6	6,165,600
External Grants	3	5,132,618
Total	32	21,613,403

INTERNATIONAL COLLABORATIONS

University of California Berkeley (UCB), USA

An agreement has been signed between the UAEU and the UCB (USA) to develop collaborative research programs in areas of mutual interests, especially in the research areas of nanoscience, nanoarchitectures, chemistry, material sciences, and applied sciences. The collaboration was initiated by the COS, led by the former Dean of the COS, Prof. Ahmed Murad. The research teams are led by Professor Omar M. Yaghi, as the Co-Director, Berkeley Global Science Institute) in the College of Chemistry and Berkeley Global Science Institute at UCB and by Dr. Mohamed Alazab Alnaqbi, as Co-Director, UAEU.



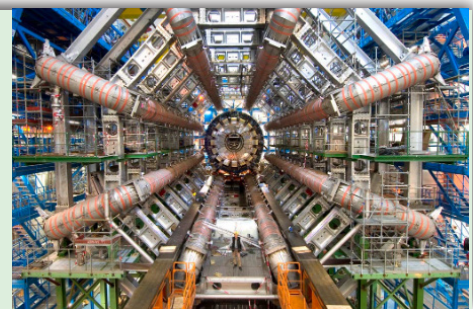
Chinese Academy of Sciences

The following three joint-projects have been awarded based on this research collaboration:

1. “Detection and determination of carbamate pesticides and related metabolites in camel milk products of UAE” led by Prof. Mohammed Meetani, Department of Chemistry
2. “Population genomic approach to guide the conservation of commercially important fish in the Arabian Gulf” led by Prof. Sabir Bin Muzaffar, Department of Biology
3. “Toward high efficiency and large-scale production of flexible perovskite solar cells” led by Dr. Adel Najar, Department of Physics

ATLAS Collaboration at CERN

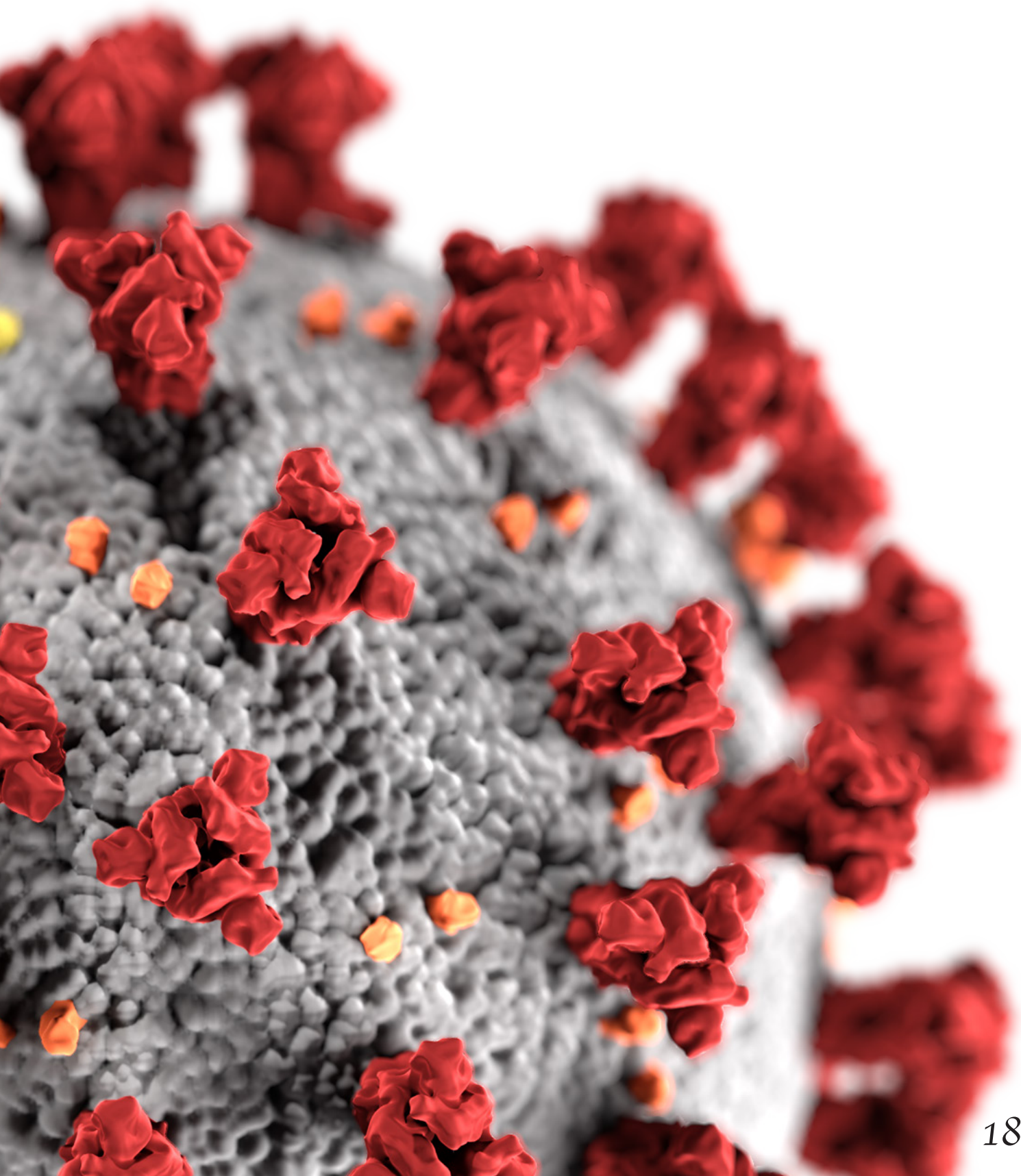
On 2 July 2021, UAEU was granted full membership of the ATLAS Collaboration at CERN-Large Hadron Collider (LHC), as part of a cluster of institutions representing the UAE. This would be the first initiative to develop the field of high energy physics in the Gulf Cooperation Council (GCC) region.



Murchison Wide-field Array (MWA), Curtin University, Australia

UAEU, represented by the COS, was granted membership of the Murchison Wide-field Array (MWA) consortium in a MWA Board of Directors virtual meeting on 25 June 2021. The collaboration between UAEU and MWA, was established in October 2019 in order to deploy and commission a “Radio-Array Space Observatory for Multidisciplinary Space Science Research” at UAEU. This project is jointly supported by the COS and the National Space Science & Technology Centre (NSSTC) based at UAEU.

DURING THE PANDEMIC



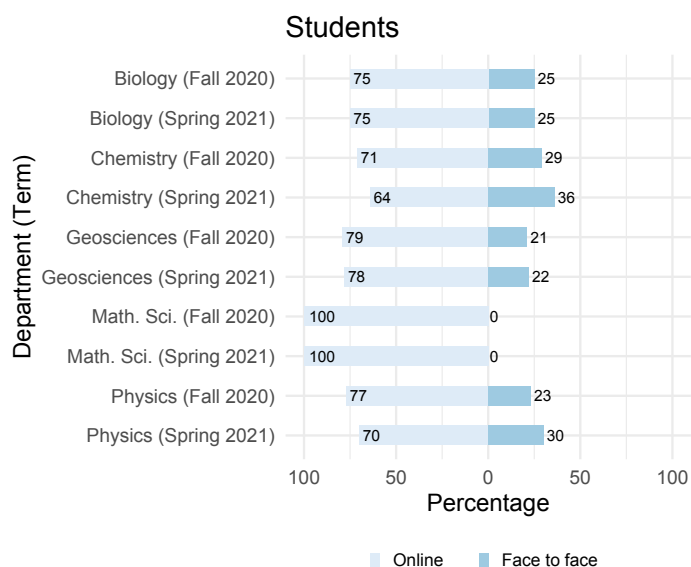
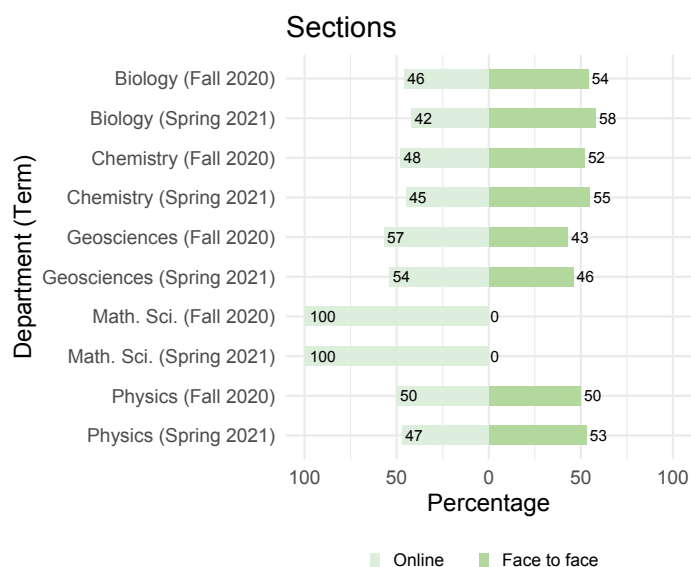
TEACHING AND RESEARCH

Teaching

The unexpected COVID-19 pandemic, has been both a challenge and an opportunity. Our teaching methods were remarkably adapted to suit the needs of our students. The COS faculty, instructors, and staff showed extraordinary flexibility in embracing online teaching. Both undergraduate and graduate courses were overhauled to adjust to the new situation and virtual laboratory sessions were successfully developed.



Online and face-to-face teaching during COVID-19



Research on COVID-19

Following the outbreak of the pandemic of COVID-19, COS has played a major role in establishing a university-wide COVID-19 Task Force. The taskforce and other members of the College have published several original research papers and reviews in high impact journals.

SERVING THE COMMUNITY



Modeling the progress of the disease

Dr Abdessamad Tridane and colleagues studied the spread of COVID-19 on different population density areas and the impact of lockdown on the spread of the disease in the emirate of Abu Dhabi. He was also a consultant to the Department of Health (DOH) in Abu Dhabi for a project on mathematical modeling of the health capacity and demands during the pandemic. During this project, and based on the number of active cases, the team was able to give daily estimations of the basic reproduction number. Their model predicted the number of needed acute and critical beds during pandemic with 95% accuracy. This helped the healthcare decision-makers to be prepared in planning to contain the pandemic and lower its burden on the healthcare system. This effort was rewarded by a UAE Innovation Reward 2021.



Sanitizer project

The College of Science initiated a project to prepare an effective and affordable disinfectant through the Department of Chemistry. A team of faculty members and staff from the department participated in this project and formulated a spray and hand rubbing gel sanitizers. The antimicrobial activity of these formulations was also evaluated and tested in the Department's laboratories. It was approved by Dubai Municipality Health and Safety Department after these were tested in their laboratories for quality assurance. The Department contracted a licensed factory for filling and packing the products. 8760 bottles of different sizes of the products were prepared. The products were distributed as a donation from the university.



Cooperation with the General Authority of Islamic Affairs and Endowments, Al Ain

The Department of Biology served the community with its expertise in May 2020 through a cooperation with the General Authority of Islamic Affairs and Endowments, Al Ain Branch. This cooperation was through the testing the effectiveness of disinfectants used at mosques in Al Ain to disinfect the carpets. Samples from the carpets were taken before and after the application of the disinfectant from 8 random mosques. Samples were tested in the Department's laboratories for the total number of bacteria and fungi in the carpet samples. Also, the presence of coronavirus was also tested in the carpet samples. The team was led by Prof. Khaled El-Tarabily.

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