



## Annual Report

### FACULTY of SCIENCE

#### I. REFLECTION

Despite the never-ending challenges faced due to the COVID-19 pandemic combined with Lebanon's financial crisis, the Faculty of Science is committed to fulfill its mission, by providing high quality education and research centered on fundamental and applied sciences. Teaching in the Faculty underwent a transition to remote teaching and learning during the academic year 2020/2021. Several platforms have been adopted by the Faculty members to ensure academic follow up with students and minimize the disruption to their learning. With on-campus lab work halted, Faculty members and graduate students made progress in finalizing research papers and thesis or moving ahead in computational research projects and published more than 100 peer-reviewed articles in internationally indexed journals in various science research fields.

#### II. TEACHING & LEARNING

- Faculty members have used a **mix of synchronous** (real-time) **and asynchronous** (any time) **online teaching and learning tools**, not only to keep students engaged throughout the duration of the course, but also to enable more flexible, personalized, and active learning. A range of student-centered and active learning approaches have been employed in all courses to improve comprehension and retention by increasing student engagement in virtual classrooms and their subsequent mastery of complex topics.
- Live video conferencing platforms, **Microsoft Teams** and **Zoom**, were used for synchronous online learning activities. Among the synchronous teaching & learning tools used for the delivery of courses during COVID 19 are: conventional online lecture components through live video conferencing, problem-solving, case studies and activity-based learning, webinars and tutorials, virtual lab experiments and simulations, student presentations, online class discussion.
- Several **online interactive tools** have been effectively integrated during virtual classrooms. Among them are: **Breakout rooms feature** in Microsoft Teams and Zoom to facilitate discussion in small groups and perform collective group work. **Padlet**, where students share their answers to relevant question from the instructor during lecture on virtual bulletin boards. **DirectPoll**, to set multiple choice questions, feel the pulse of students and visualize in real-time their incoming answers during virtual classrooms. **AnswerGarden**, for real-time brainstorming and classroom feedback. **Kahoot**, for facilitating discussions, multiple-choice quizzes, polls, surveys, collecting data in real-time. Questions are projected on a shared screen, while students answer



using their smartphone, tablet, or computer; creating a social, fun and game-like environment.

- The e-learning platform, **Moodle**, was used to facilitate all asynchronous activities in fully online Faculty courses and to manage as well blended Laboratory courses. Moodle allowed the instructors to monitor students' progress over time, linked the instructor with the students and enriched their asynchronous learning experience by providing them a place to retrieve course information, submit assignments, share information, interact through discussions and sit for online exams. Course materials and readings for each week were uploaded on Moodle. Among the asynchronous teaching methods used: offline audio-recorded PowerPoint presentations uploaded ahead of online lectures, assignments, research topics, reports on published research studies and lab reports by students, video demonstrations, discussion forums, question and answer sessions, and virtual office hours and open e-textbook tests.
- The Faculty conducted final exams of Fall semester online and Spring semester on campuses in alignment with covid-19 safety measures and precautions.
- Surveying the local and global job market needs, the Faculty has developed a **new BSc. degree program in "Healthcare Information Technology"**, in addition to a **Professional Master's degree program in Ecosystems, Environmental Management and Restoration (EEMR)** in collaboration with Montpellier University.
- The Faculty has engaged in several **science outreach activities** to increase awareness of the importance and value of Science to society, to inspire and support future scientists, problem solvers and innovators. Herein a list of those activities:

The Faculty organized a **webinar entitled "Radioactivity in everyday Life"** in cooperation with the "Lebanese Association of Physics Teachers" for high school students and teachers on December 11, 2020. It discussed how to introduce radioactive materials in the Lebanese educational curriculum and highlighted the importance of nuclear and radiological physics and how they are implemented to serve all the aspects of life. Pr. Mohammad Badawi, Head of the Physics Department, gave an extensive presentation on the use of radioactive materials in various technological sectors, discussed the health effects from radiation, the importance of radiation protection field and highlighted the advances in the medical physics sector.

The Faculty organized **BAU Virtual Science Fair for High School Students** to encourage and support schools' efforts, in the development of scientific minds and promote creativity, teamwork and independent thinking among students. 164



participating high school students from 24 different schools across Lebanon have submitted online a total of 86 video projects in four categories: astronomy, environmental sciences, health & life science, physical & chemical sciences and STEAM. All projects were evaluated per brief by a curated panel of judges in a two-stage process: shortlisting and interviews. During the first stage, 13 projects were shortlisted and announced via Zoom live streaming on Monday, April 12th. After interviewing all shortlisted students, the panel deliberated and selected the Top 3 winning teams who received BAU scholarships in Science Majors, 70% Scholarships on tuition fees for Math, Physics and Chemistry Majors and 40 % Scholarships on tuition fees for Computer Science, Biology and Biochemistry majors. Herein the Top 3 winning projects:

- First place: **Microplastics Health project**, by Reine Safsouf, Lea Moudallal & Tala Tabbarah, from **Hariri High School II**
  - Second place: **Nature VS. Covid-19**, project by Amar El-Siblini, Sana Dandashly & Marwa Houssami, from **Beirut Annunciation Orthodox College**
  - Third place: **Phy-Sound**, project by Salam Abi Ghanem & Maen Abi Ghanem, from **Shouf National College**.
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- The Faculty organized several **online orientation sessions for Grade 11 and 12 students** from different schools, aiming to provide them with a clear perspective of what is ahead, along with a strong overview of academic expectations and career opportunities in Science Majors (Physics, Math, Computer Science, Chemistry, Biology and Biochemistry) so they will be better prepared to make the right choices.
  - The Faculty organized webinars featuring distinguished scientists and professionals to present and discuss current issues, trends and challenges in science. Herein a list of these webinars:
    - “Can the digital world be sustainable” by **Dr. Luc Sorel, senior software engineer at Zenika France** (October 1st, 2020).
    - “Introduction to Java Hibernate” by **Mr. Mahmoud Anouti, senior software engineer at Murex** (October 15<sup>th</sup>, 2020, online).
    - “Ethical Hacking” by **Mr. Ahmad Halabi, cyber security specialist and security consultant** (May, 28<sup>th</sup> 2021).
    - “Unravelling Complex Biological Mechanisms in Bacteria Using State of the Art Techniques” by **Dr. Hafez El Sayyed, Research Fellow at Oxford University, UK** (April 7<sup>th</sup>, 2021)



### III. ACHIEVERS

- Faculty's Dean, Prof. Ramadan Awad, was nominated as a co-organizer and a chair of a session titled: "Permanent Magnets: Materials and Their Applications" at the 7th International Conference on Superconductivity and Magnetism- ICSM2020 which was supposed to be held between 19th and 25th of April 2020 in Bodrum, Turkey, but due to COVID19 pandemic, the conference was postponed to April 2021. ICSM has become a prominent platform, accepting around one thousand contributions from internationally recognized reputable research institutions in over 60 countries.
- Pr. Mohamed. S. Badawi, Head of Physics Department, participated in the symposium held online by the Association of Arab Universities to introduce the international center on the use of synchrotron radiation in the field of experimental sciences and its applications in the Middle East on October 18, 2020.
- Dr. Mahmoud Khalil, Head of Biological Sciences Department, participated as an expert and a Key speaker in the webinar OERWiki@Mena to promote the creation of the Open Educational Resources (OER) in the Middle East and North Africa Region. His talk was entitled "Eight Keys for Understanding OER" (March, 1st, 2021). Dr. Khalil was also invited as a guest speaker by Friends Innovative Technology and Science (FITS) to deliver a webinar entitled "Epigenetics: Future Road for Cancer Therapy" (Feb, 21, 2021). The FITS initiative is committed to raising scientific awareness among the public audience and spreading cutting-edge science and knowledge. He was also invited in July, 22, 2020 to deliver a webinar on e-Cheating and e-Authentication within the activities of the Alexandria University Unit for Pedagogical Innovation and Distance Learning (ADIP).
- Dr. Toufic Al Arwadi has been promoted to full Professor of Mathematics.
- Computer Science students participated in several online programming competitions: the **Arabic Collegiate Programming Contest (ACPC2020)** (October 3<sup>rd</sup> 2020), **Huawei ICT Competition** (November 11<sup>th</sup> 2020), the **Lebanese Collegiate Programming Contest (LCPC 2020)** (February 9<sup>th</sup> 2021). One BAU team ranked 6<sup>th</sup> among 52 participating teams in LCPC 2020.
- Ten student groups from the computer science program in Debbieh, Beirut and Tripoli campuses participated in the **Game Academy**, organized by Khaddit Beirut Association (May 2021).
- Two student groups from the computer science program in Debbieh, Beirut and Tripoli campuses participated in the **8<sup>th</sup> Undergraduate Virtual Research Competition**, organized by Abu Dhabi University (May 19<sup>th</sup>, 2021).