



ORIC Activities Report

Fall-2020

Dated: 29th April 2021

Prepared by:

Office of Research, Innovation and Commercialization (ORIC)

Capital University of Science & Technology, (CUST)

Islamabad

Abstract

Capital University of Science & Technology (CUST), Islamabad since its foundation has always focused on providing quality higher education in the country. The University believes that nations can flourish through an active research culture and a continual process of knowledge building for productivity. The core objective of Office of Research, Innovation and Commercialization (ORIC) is to provide strategic and operational support to the university research activities, strengthen academia-industry linkages and promote entrepreneurship, technology-transfer and commercialization activities. ORIC at CUST is working under three major domains namely Research Operations, Technology Incubation & Innovation and Industrial Liaison.

Office of Research, Innovation and Commercialization is working on integration of research and education at all levels of the institution. ORIC at CUST have a central role in facilitating the University's research outcomes and Technology Incubation & Innovation activities. We are diligently working in translating research for the public's benefit by facilitating University faculty and students in doing quality research publications and increasing external research funding.

We believe in continual capacity building of our students to equip them with modern tools and skills vital for the industry. In this regard numerous technical trainings, workshops and seminars are being conducted on regular basis to provide students, faculty members and professionals with the contemporary technical tools and skills. ORIC is also working on the establishment of CUST Business Incubation Center and commercialization of low risk, small investment and marketable project ideas.

A number of joint ventures are being done with industry through mutual collaborations. ORIC at CUST is continuously working on to build and maintain strong Academia-Industry Linkage with the focus on promoting and making CUST graduates the premium choice for the employers. The industrial visits are being arranged on continual basis where notable organizations are invited on campus. ORIC is working to promote academic collaborations and to explore the areas of mutual interest and employment possibilities for CUST students.

ORIC Activities Report Fall-2020 showcases recent progress of ORIC in Fall-2020. The report presents the accomplishments and contributions of ORIC in accordance with its defined domains.



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

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ORIC Activities Report Fall-2020

To make research a top priority for a sustainable economic growth and future knowledge economy at Higher Education Institutions (HEIs), HEC aimed to establish pivotal centers at universities. These centers are known as Offices of Research, Innovation and Commercialization (ORIC). At Capital University of Science and Technology (CUST) Offices of Research, Innovation and Commercialization started its working in September 2017 under the patronage of Prof. Muhammad Mansoor Ahmed, Vice Chancellor, CUST.

Mission statement for ORIC at CUST as approved from BASR is entitled as *“To motivate and facilitate the university researchers to innovate and collaborate with the stake-holders leading to resource generation through commercialization”*. Based on this mission ORIC operations have been divided into three major domains including:

- a) Research Operations (RO)
- b) Technology Incubation and Innovation (TII)
- c) Industrial Liaison (IL)

Brief Overview of Major Activities Performed by ORIC in Fall-2020

The objective of ORIC is to develop, expand, enhance and manage the university’s research program and to link research activities directly to the educational, social and economic priorities of CUST and the society. ORIC at CUST have a central role in facilitating the University’s research outcomes and Technology Incubation & Innovation activities. The brief overview of activities performed by ORIC in Fall-2020 is given below.

Research Operations

ORIC has the responsibility of guaranteeing that all research programs and policies reflect the core values of academic freedom, professional integrity, ethical conduct. During its short span of time ORIC has worked in facilitating its faculty and students in doing quality research publications.

A. Indigenous Development of Drone Detection Radar-Research Proposal Submitted to Ministry of Education, Kingdom of Saudi Arabia

Drone technology has emerged as one of the biggest threats in the ever-changing world of modern warfare, they are readily available in the market and are more capable in carrying dangerous weapons on the board. The internationally available radar systems are expensive, our project proposes a cheaper and efficient Drone Detection Radar system which has a potential to penetrate to the national and international markets. By indigenous manufacturing, a cheap and reliable Drone Detection Radar system can be manufactured and commercialized in local strategic and defense Industry and International market. The proposed project



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provides an indigenous, low cost, economical and field worthy product of a Drone Detection Radar system avoiding the risk of cyber-security and jamming, and solving the critical problem of mitigating drones' intruders on the government/corporate sites of critical nature. The research proposal is submitted by Office of Research, Innovation and Commercialization to Ministry of Education Kingdom of Saudi Arabia in collaboration with Prof. Munawar Khalid, King Abdul Aziz University Saudi Arabia.

B. ORIC Research Committee Meetings

The 13th ORIC Research Committee Meeting was held on October 06, 2020 and was chaired by Dean Research & Innovation, Prof. Aamer Iqbal Bhatti. The meeting started with the presentation of ORIC Activities Calendar Fall-2020 by Dean Research & Innovation before Research Committee members. He also updated members about Research Proposals Status, Faculty Research Report Spring-2020 and newly launched Startups "Tech Flickers" and "Flex Tracker" and CUST Incubation Center (CIC). The 14th ORIC Research Committee Meeting was held on December 01, 2020 and was chaired by Dean Research & Innovation, Prof. Aamer Iqbal Bhatti. The meeting mainly discussed the effective outreach of local industry especially pharmaceutical industry and the strategies to bring them on table for academia/industry linkages and commercialization.

C. Updation of Research Database and Publications

The Research Database was updated including updation of university Journal and Conference Publications, MOUs signed and Research & Development Projects accomplished by CUST faculty in Fall-2020.

D. Upgradation of ORIC Webpage

The webpage of ORIC is updated on Monthly basis as per directions of Vice Chancellor. The data about ORIC Events, Industrial Collaborations, R&D Projects, Research Publications, PhD Repository and Downloads Section is updated regularly.

E. Design of Faculty Research Group Poster

The posters for Center for Software Dependability (CSD) and Solution to Energy Environment Problems (STEER) were compiled by ORIC to display the research achievements of the group leads and major fields of research. The Center for Software Dependability is headed by Prof. Aamer Nadeem, HoP SE Department, while STEER is headed by Dr, Saira Ahmed, Directorate of Sustainability and Environment.

F. Impact Factor Verification of Faculty Research Honorariums

It is core responsibility of ORIC to verify the Impact Factor of faculty research publication honorariums in accordance with the updated HEC Journal Recognition System (JRS). ORIC performs this activity on daily basis.

G. CUST PhD Repository and Research Posters

ORIC maintains a comprehensive database of PhD Graduates of CUST which includes all details of PhD alumnus including name, thesis title, supervisor name and year. Till now 190



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PhD's are graduated in various disciplines including Management & Social Sciences, Computing, Engineering and Health & Life Sciences.

ORIC has also designed a standard PhD Poster Template and is responsible for coordination and revision of posters sent by students. It is requirement for every PhD student to submit a poster related to their research work to ORIC. The objective behind the activity is to promote and acknowledge the research work done by the student and supervisor. The posters are displayed in the university to highlight research output of each department. Till now a total of 70 poster have been displayed at the campus.

H. CUST Faculty Research Output Report-2020

ORIC compiled Faculty Research Report for presentation in meeting of Executive Committee. The research output of academic departments in 2020 was highlighted in a comprehensive way. The report details the Number of Research Publications, Impact Factor, and MS and PhD students supervised by faculty.

Technology Incubation and Innovation

Office of Research, Innovation and Commercialization not only accomplishes research and development operations but also ensures continual activities in terms of technology innovation and incubation. In this regard numerous technical trainings, workshops and seminars are being conducted on regular basis to provide students, faculty members and professionals with the contemporary technical tools and skills. The university is also working on establishment of Business Incubation Centers and commercialization.

A. Series of Workshops on Latex-Typesetting Software

Latex is a Typesetting system suitable for producing scientific and mathematical documents which enable authors to typeset and print their work at the highest typographical quality. It is most often used for medium-to-large technical or scientific documents and can be used for almost any form of publishing. Keeping in view its significance, Office of Research, Innovation and Commercialization (ORIC) has started series Workshops on continual basis to facilitate graduate students in their thesis write-up. The series of workshops were conducted on 21st October 2020 and 16th December 2020 respectively. The workshops were conducted by Mr. Umair Rafique Research Associate, Electrical Engineering Department, CUST. The purpose of workshop was to equip participants with most updated knowledge about creation of technical documents using Latex with practical illustrations.

B. Inaugural Lecture of Prof. Dr. Majid Ali

An Inaugural lecture is an occasion of significance in a faculty member's career. Professors are usually required to give their inaugural lecture within 12 months of their appointment. Office of Research, Innovation and Commercialization organized the Professorial Inaugural Lecture to honor Engr. Dr. Majid Ali, Professor, CE Department and Convener, University Health, Safety and Security Committee on 31st December, 2020. The lecture was delivered on the topic entitled "Do We Live in Safe Housing? (From earthquakes point of view)".



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The session started with a brief introduction of Prof. Majid Ali regarding his extraordinary academic and research achievements presented by Assistant Director ORIC. The talk enclosed the conventional building techniques, and current practices followed on worldwide for safe and earth quake resistant housing. The speaker discussed the subject in an extremely interactive and simpler way, understandable by participants across various academic backgrounds. A total of 34 faculty members and research scholars from various departments attended the event. The event lasted for more than 1:30 hours including Q/A session. The response of faculty members was quite promising.

C. FYPs Business Plan Funding Competition

Office of Research, Innovation and Commercialization has continued its initiative of Final Year Projects funding for Undergraduate students of CUST. The purpose of the activity is financial encouragement of students whose project ideas have particular business and marketing prospective. The event was advertised in November and the proposals for funding were received till 10th December 2020. The evaluation/shortlisting of the applications was done by ORIC Research Committee Meeting. The committee evaluated the applications in accordance with the practical feasibility, business plan and marketability of each project. After a systematic analysis by Research Committee, top six projects were shortlisted for the funding encompassing 30,000 PKR each.

D. Workshop on Endnote-Publishing software for Researchers

EndNote is a multiplatform software tool that helps you manage the process of writing and preparing research papers and thesis, and transfer and store references from electronic databases and library catalogues. It can easily be used to change styles, format a bibliography view and synchronize your library and work across devices. Office of Research, Innovation and Commercialization (ORIC) organized One-Day Workshop on Endnote on 26th January 2021. The purpose of the workshop was to educate participants with the most updated knowledge about Endnote and its use in the process of research papers and thesis write-up.

The workshop covered some of the basic topics related to EndNote like Citation Components and Referencing Styles, Reference Management, Library Reference Storage etc. The workshop contents were augmented with practical demonstration on software. The session was conducted by Dr. Syed Shuja Safdar Gardezi, Assistant Professor CE Department and Director BIM Center of Excellence, CUST. A total of 35 participants including the faculty members, research scholars and students from various departments attended the workshop.

E. Meeting of ORIC with Directorate of Corporate Linkages (DCL)

Office of Research, Innovation and Commercialization and Office of Corporate Linkages conducted a meeting to extend joint industrial collaboration efforts. The meeting was held on 1st January, 2021 at Directorate of Corporate Linkages. Dean Research & Innovation chaired the meeting. It was discussed to devise a mechanism of Liaison with Strategic and Corporate Organizations with special focus on local Pharmaceutical Industry.



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F. Collaborative Session of ORIC with SJTU, China

To promote industrial linkages and move towards International Ranking, a joint session was conducted with Shanghai Jio Tong University (SJTU) representatives. The agenda of the meeting was focused on various factors playing role in international ranking and how to achieve those. Vice Chancellor CUST Dr. Mansoor Ahmed convened the meeting. Dean Research & Innovation, Dean Faculty of Computing, Dean Quality Enhancement Cell, HoDs of Mathematics, Mechanical Engineering and Computer Science Departments were also present in the meeting.

G. Joint Collaborative Session with Enablers Pvt Ltd, Islamabad

To encourage students towards E-Commerce, Online Business and Digital Marketing, Office of Research, Innovation and Commercialization conducted a collaborative meet-up with officials of Enablers Pvt Ltd (E-commerce and Digital Marketing Agency). The meet-up discussed the significance of online business and E-commerce, and about how to motivate students to adopt to the changing business dynamics. An interactive session with CUST students was also agreed upon by Enablers team to update them about online business opportunities and relevant domains.

Industrial Liaisons

ORIC at CUST is continuously working on to build and maintain strong Academia-Industry Linkage with the focus on promoting and making CUST graduates the premium choice for the employers. ORIC is working in collaboration with various Departments to promote Academia-Industry Linkage. The industrial visits for either sides are being arranged on continual basis to promote academic collaborations and explore the areas of mutual interest and employment propensities for CUST students.

A. Optimization and Establishment of In Vitro Cultures of Potato, Banana and Ornamental Plants for Commercialization

Plant Tissue Culture is one of the most rapidly growing areas of biotechnology because of its high potential to develop improved crops and ornamental plants. Plant tissue cultures is associated with a wide range of applications ranging including production of pharmaceutical, medicinal and other industrially important compounds. The project involves wide range of research of new varieties of plants and seeds. The outcome of paper will be documented in research journals and filing of National and International patents. The knowledge gained in process will help to produce projects at MS and PhD level. Commercially the project will help to establish tissue culture supply chain of ornamental plants to Nurseries and Plants.

B. Industrial Collaboration with Public Sector Strategic Organization

To extend research and development activities, CUST and a Public Sector Strategic Organization joined hands together. An MoU was signed to foster a collaborative framework with a view to benefit from each other's initiatives and working procedures, and to support collaboration among researchers. The collaborative agreement was signed on 9th Feb 2021 by Dean Research & Innovation and Director HRD from respective organizations.



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C. Establishment of CUST Business Incubation Center

ORIC started Business Incubation Center under the name of CUST Incubation Center (CIC). The objective of center is to provide focused support to entrepreneurs through a supportive environment that helps them establish their business ideas and develop their concepts into market ready products.

The SECP registered company “Tech Flicker” is the first ever incubated company at CIC. Tech Flickers team comprised of experienced developers, graphics designers, content writers, SEO specialists, and digital marketers are driven to produce impactful results. The progress of the company is quite promising and has developed two of its own POS products. Other startups working at CIC are:

- IoT Based Power Control Devices
- Vehicle Management System (FlexTracker)
- Amazon Based Virtual Assistance

D. Consultancy Services for E&DC, Islamabad by CUST Faculty

CUST comprehends the value of its faculty/staff undertaking consultancy for outside bodies. Consultancy is an important channel through which knowledge and expertise can flow to and from businesses and other external agencies and therefore contributes to the development of growing and productive relationships with these bodies. Engr. Prof. Dr. Majid Ali, Department of Civil Engineering executed consultancy work for structural Evaluation of the Under Construction Commercial Building at Bahria Enclave, Islamabad.

Additional Tasks

A. Drafting, Editing and Publication of ORIC Newsletter Spring-2020

The fourth volume of ORIC Newsletter was drafted, printed and distributed to around 100 Universities. The Newsletter briefly showcases the progress report of ORIC in terms of its stated domains i.e. Research Operations, Technology Incubation & Innovation and Industrial Liaisons. It also highlights workshops, seminars and other similar events accomplished by ORIC in Fall-2019. The Newsletter would be shared with all the university academic and administrative offices upon its publication

B. Drafting, Editing and Publication of ORIC Activities Report Spring-2020

The ORIC Activities Book for Spring 2020 was compiled and published as per directions of VC Office. The book showcases the activities and events proceeded by ORIC as per its stated domains in the recent semester.

C. Drafting of CUST Annual Report 2019-20

CUST Annual Report 2019-20 was compiled, drafted and submitted to VC Office for finalization and printing. The book provides information about every aspect of the university supported with facts and figures.



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D. Faculty Research Profiles Validation

ORIC has also done the Research Profiles validation of faculty members which includes authentication of their research publications with Impact Factors, Journal Category, Citations and similar factors as per recommendation of Vice Chancellor.

E. Faculty Profiles/Resumes Updation on Website

ORIC in collaboration with Web Development Office has identified, collected and updated the missing data of Faculty Profiles on CUST Website. The data included information related to Teaching, Research Publications, MS/PhD Thesis Supervised, Research Areas and Professional Experience.

Prepared by:

Muhammad Raheel Anjum
Assistant Director ORIC

Reviewed by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



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List of Annexures

- A. Minutes of 13th ORIC Research Committee Meeting
- B. Minutes of 14th ORIC Research Committee Meeting
- C. Research Group Poster of Solution to Energy Environment Problems (STEEP)
- D. Research Group Poster of Center for Software Dependability (CSD)
- E. Faculty Research Report-FoC
- F. Faculty Research Report-FoE
- G. Faculty Research Report-FHLS
- H. Faculty Research Report-FMSS
- I. Faculty Research Report-Pharmacy
- J. Reports-Series of Workshops on Latex-Typesetting Software
- K. Report of Inaugural Lecture of Prof. Dr. Majid Ali
- L. Advertisement of FYPs Business Plan Funding Competition
- M. Report of Workshop on Endnote-Publishing software for Researchers
- N. Minutes of Meeting of ORIC with Directorate of Corporate Linkages (DCL)
- O. Proposal for Optimization and Establishment of In Vitro Cultures of Potato, Banana and Ornamental Plants for Commercialization at CUST
- P. Advertisement of ORIC Certification Courses-Fall-2020
- Q. Leaflet of CUST Incubation Center Startup “Tech Flickers”
- R. Leaflet of CUST Incubation Center Startup “Amazon Virtual Assistant Based Trading”
- S. Leaflet of CUST Business Incubation Center Startup “IoT Based Power Automation and Control”
- T. Agreement of Consultancy Services for E&DC, Islamabad



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13th ORIC Research Committee Meeting

Minutes of the Meeting held on October 06, 2020

- The 13th ORIC Research Committee meeting was held on Tuesday, the 06th October, 2020 at 03.30 pm in Conference Room, F-Block.
- Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, presided the meeting.
- The following were present in the meeting:
 - Dr. Sahar Fazal HoD BS
 - Dr. Majid Ali Professor CE
 - Dr. Abdul Rehman Kashif Associate Prof. Math
 - Dr. Umer Amir Khan Assistant Prof. EE
 - Dr. Khawar Naveed Assistant Prof. ME
 - Dr. Mahboob Alam Assistant Prof. Pharm
- Dr. Nadeem Anjum and Dr. Samiya Safdar took part in the meeting as the respective participants nominated by CS and MS Departments respectively.
- Dean Research and Innovation, Prof. Aamer Iqbal Bhatti welcomed the committee members. Subsequently, the meeting progressed as per agenda items listed below: -

Item #1 Review of Minutes of Previous Meeting

Action By

- 1.1 It was informed that no observation on the decisions taken in the 12th meeting of the ORIC Research Committee circulated amongst the members of the Research Committee on March 13, 2020 was received. Therefore, the Committee confirmed the minutes of its 12th meeting.

Item #2 ORIC Activities Calendar Fall-2020

- 2.1 Dean Research & Innovation presented the ORIC Activities Calendar Fall-2020 before Research Committee members. He apprised the members about the events and tasks intended by ORIC and projected list of workshops, seminars, meetings and similar activities to be held in the succeeding semester. He updated the members about the research proposals and CUST Annual Report 2019-20 to be worked on in present semester. He also underlined the planned timeline for ORIC Newsletter and

Activities Book for Fall-2020.

- 2.2 Dean Research & Innovation also updated the members about the FYPs Funding Competition which is planned to be held in November 2020 after a contended response in recent semesters. Prof. Majid Ali suggested to organize regular workshops on Endnote like Latex which is an industry standard software tool for publishing and managing bibliographies, citations and references, which Dean Research & Innovation graciously accepted. ORIC

Item #3 ORIC Startups Tech Flickers and Flex Tracker

- 3.1 Dean Research & Innovation updated the members about the inauguration of first ever incubation company of CUST entitled “Tech Flickers”. Tech Flickers is a SECP registered Startup incubated by two of the much endowed Computer Science graduates, Mr. Arslan Akram and Mr. Shoaib Ali. The company provides services in different areas of software development. and upholds the highest standards for project planning and execution, and is dedicated to delivering the perfect services for business needs on-time and on-budget. At present, Tech Flickers is successfully pursuing various projects in accordance with customer requirements. Dean Research & Innovation directed Assistant Director ORIC to arrange a brief presentation of Tech Flickers by their founding members in next meeting. ORIC
- 3.2 The Commercialization aspects of Flex Tracker were deliberated in brief. Flex Tracker is an application developed by CUST students and faculty that can be employed by various companies/organizations to track their vehicles or goods with the features of dynamic stop and route configurations, comparison of followed route by driver against actual defined route, live vehicles location on map, and over speeding notification. The recent progress report of ORIC about their collaboration with CS and MS departments in this regard was also discussed.

Item #4 Research Proposals Status

- 4.1 Dean Research & Innovation updated the members about the current status of research proposals. He presented the list of proposals which have been submitted in various funding agencies like LCF, NRPU, PSF, Ignite and P&D Board Punjab. He also shared the details of recently approved proposals by HEC under National Research Program for Universities (NRPU) and greeted the members.
- 4.2 Dean Research & Innovation also shared the details of a proposal approved by CUST Head office regarding Optimization and Establishment of In-Vitro Cultures of Potato, Banana and Ornamental Plants for Commercialization in

Collaboration with Department of Biosciences. The proposal's idea was conceived in one of the brainstorming session held with BS department in previous semester. He also requested members to motivate their respective departments for proposal write-up. He further assured that ORIC would fully endorse the departments in proposals writeup and related procedures

Item #5 Faculty Research Report Spring-2020

5.1 Faculty Research Report Spring-2020 was conversed in detail. ORIC
Dr. Majid Ali pointed out that some of the publications of CE department were missing in the report. Dean Research & Innovation explained that the report contains data till 23rd meeting of BASR held on 27th July 2020. He also directed Assistant Director ORIC to scrutinize publications data from Research Committee members, whenever updation is done. Dr. Majid Ali and Dr. Sahar Fazal suggested to add the Non-Impact Factor Journal Publications in Research Report because they are also done out of devoted efforts of faculty members.

5.2 Dr. Majid Ali asked about the modified policy of HEC ORIC
regarding journal category of research paper for PhD requirement. Dean Research & Innovation responded that to be on a safer side, PhD scholars should publish their paper in HEC W Category recognized journals. He also directed Assistant Director ORIC to share the relevant updated university policy/status with Research Committee members.

Dr. Mehboob Alam questioned about the CUST faculty promotion criteria with regard to newly developed HEC HJRS system. Dean Research & Innovation responded that HEC HJRS System is functional and University will verify the faculty publications based upon this system for their faculty promotion.

The meeting ended with a vote of thanks to the Chair as well as the participants of the meeting.

Prepared by:



Muhammad Raheel Anjum
Assistant Director ORIC

Approved by:



Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



Capital University of Science and Technology

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Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

14th ORIC Research Committee Meeting

Minutes of the Meeting held on December 01, 2020

- The 14th ORIC Research Committee meeting was held online on Tuesday, the 01st December, 2020 at 03:30 pm on Microsoft Teams.
- Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, presided the meeting.
- The following were present in the meeting:

• Dr. Majid Ali	Professor CE
• Dr. Abdul Rehman Kashif	Associate Prof. Math
• Dr. Nadeem Anjum	Assistant Prof. CS
• Dr. Khawar Naveed	Assistant Prof. ME
• Dr. Samiya Safdar	Assistant Prof. MS
• Dr. Mahboob Alam	Assistant Prof. Pharm

- Dr. Sahar Fazal and Dr. Umer Amir Khan, members from BS and EE Departments respectively could not attend the meeting.

- Dean Research and Innovation, Prof. Aamer Iqbal Bhatti welcomed the committee members. Subsequently, the meeting progressed as per agenda items listed below: -

Item #1 Review of Minutes of Previous Meeting

Action By

- 1.1 It was informed that no observation on the decisions taken in the 13th meeting of the ORIC Research Committee circulated amongst the members of the Research Committee on October 15, 2020 was received. Therefore, the Committee confirmed the minutes of its 13th meeting.

Item #2 Outreach of Local Pharmaceutical Industry

- 2.1 Dean Research & Innovation apprised the members about the defined roles of ORIC at CUST. He mentioned that two of the three domains, namely Research Operations and Technology, Incubation & Innovation are going well. The ORIC Business Incubation Lab is set to start its functioning with two startups “Tech Flicker” and “Flex Trackers”. He said that we have to pace up our Industrial Liaison domain with effective outreach of local industry. Dean Research & Innovation started with a brief presentation about major industries in the vicinity of CUST. He updated the members that there are three major



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types of factories in Rawalpindi and Islamabad, namely Iron and Steel, Floor Mills and Pharmaceutical industry. The spectrum of Pharma Industry with respect to R&D work is wide ranging including Electrical, Mechanical, Pharmacy and Management Sciences disciplines. The list of Pharmaceutical companies outreached by ORIC was also presented along with their focal persons and addresses.

- 2.2 Dean Research & Innovation requested members to provide their valuable feedback about how to effectively outreach the local Pharmaceutical Industry. Dr. Khawar Naveed updated the members about his contact experience with “WARAFANA Pharmaceuticals”. He was of the opinion that we need to contact and invite the representatives of local Pharmaceutical Industry on continual basis. He proposed to constitute a permanent committee having representation from respective departments for effective outreach. The mandate of the committee would be to visit local Pharma Industry on continual basis (at least once in a month) and search for their problems that can be addressed by CUST faculty and students. Dean Research & Innovation directed the members to nominate a member each from their respective departments.
- 2.3 Dr. Mahboob Alam proposed that we initially need to develop specific lab infrastructure like Animal House and High Technology Pharmaceutical Lab as recommended by the Pharmaceutical Industry representatives during their visit to CUST. The mentioned equipment can attract industry because they lack the specific testing facilities like BioAssays, Bio Equivalence Testing etc. which can be done through these facilities. Dean Research & Innovation apprised that the University administration have given consent for High Technology Lab. He directed Dr. Mahboob Alam to follow up and personally take interest in the establishment of mentioned lab. Dr. Mahboob Alam added that Pharmacy Department has started the breeding facility of certain animals for research purpose. Dean ORIC directed him to arrange a small visit for particular industry once we have a reasonable setup to demonstrate them.
- 2.4 Prof. Majid commented that company CEOs look for their benefit. If certain industry has some specific problem that can be addressed through R&D, then it will seek out help from academia and we can have mutual benefit. Dean Research & Innovation updated him that the visiting Pharma Industries to CUST actually identified some areas of collaborative work but we lack mutual confidence. We need to bridge up that gap

ORIC/Research
Committee

Dr. Mahboob
Alam

Research
Committee



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

because R&D Projects would come through continuous outreach and confidence building measures. Prof. Majid Ali proposed five Final Year Projects (FYPs) from each of the EE, ME, BS, Pharm and MS Departments respectively in which collaborative work can be done with pharmaceutical industry. The initiative will not only help in knowing the shortcoming and problems of industry but will also train our students by bringing confidence in them thus increasing the probability of jobs creation. Dean Research & Innovation appreciated the floated idea and asked respective members to identify at least one project in next FYP offerings.

- 2.5 Dr. Samiya Safdar, the respective member from MS Department was of the opinion to target the industrial units and contact them frequently and look for their problems. Dr. Nadeem Anjum said that apparently CS department seems to have a supporting role but we can identify the possible collaborative areas upon meetup with industry. Dean Research & Innovation suggested him the areas like Sales, Inventory Management etc. in which CS department can collaborate with the Pharmaceutical Industry. Dr. Abdul Rahman Kashif said that although Mathematics Department is not too relevant to Pharmacy, but we will still appreciate if we can do something for effective outreach.

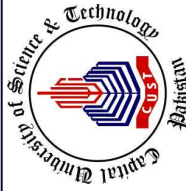
The meeting ended with a vote of thanks to the Chair as well as the participants of the meeting.

Prepared by:

Muhammad Raheel Anjum
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



Solutions To Energy Environmental Problems (STEEP)



GROUP INTRODUCTION:

The Sustainable Development Goals (SDGs) set in 2015 by the United Nations General Assembly, are intended to be achieved by 2030. Pakistan too is a signatory of these SDGs that have made the world multidisciplinary in all its facets. The research group entitled Solutions to Energy Environmental Problems (STEEP) aims to address these facets via applied research towards providing sustainable solutions to global energy and environmental issues. The scope of STEEP includes areas such as Energy Distribution, Energy and Environmental Conservation and Nexus Problems pertaining to forecasting towards the mitigation of Climate change and Food, Financial and Poverty crisis. STEEP is a multidisciplinary group that combines multiple faculties at CUST to bring together the best of futuristic and sustainable solutions. The over-arching aim is to solve society's most urgent and pressing concerns. The group has published numerous research articles in the mentioned domains.

GROUP HEAD

Prof. Dr. Arshad Hassan

Prof. Dr. Arshad Hassan is Professor of finance with consulting, research and teaching experiences in corporate reporting, corporate finance, portfolio management and financial risk management. Dr. Hassan is certified Cost and Management Accountant and has 10 years of experience of working as Professional Accountant / Auditor in public as well as private sector. He also holds membership of various professional bodies in Accounting and Finance. He is member of faculty board/Research Board of many prestigious institutions. Dr. Hassan's research and writings cover a variety of topics ranging from asset pricing to project finance. He has more than 20 papers published in refereed academic journals to his credit. He has presented number of research papers at Academic /Professional conferences in Pakistan, Turkey and USA. He is also on editorial boards of various local and international indexed journals.



RESEARCH AREAS

- Green Finance
- Mega-Project Finance
- Climate Risk Adaptation and Mitigation
- Assessing Environments for Sustainable Cities
- Environmental Impacts of Energy Technologies
- Global Atmospheric Chemistry and Climate Change
- Water-Energy-Food Nexus
- Sustainable Energy Systems and Networks
- Water and Power Distribution and Allocation
- Globally applicable Principles of Energy Policy and Techno-economics

GROUP MEMBERS

1. Prof. Arshad Hassan
2. Prof. Aamer Iqbal Bhatti
3. Prof. Majid Ali
4. Dr. Ishfaq Hassan
5. Dr. Saira Ahmed

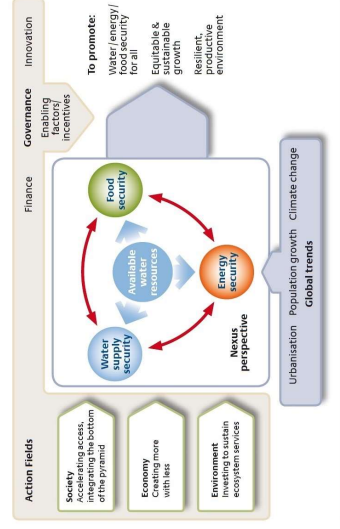
CURRENT MS/PHD STUDENTS

PHD STUDENTS

1. Mr. Abrar Hashmi (EE)
2. Mr. Shahmir Janjua (CE)
3. Mr. Muhaammad Hassau (CE)
4. Mr. Arsam Awan (CE)
5. Mr. Waqas Zafar (CE)

MS STUDENTS

1. Mr. Samar Yamin (CE)
2. Mr. Khurshid Wisal (CE)
3. Mr. Tariq Khan (CE)
4. Ms. Azza Malik (MS)



SELECTED EVENTS

- Collaboration with Directorate of Sustainability and Environment (DSE), UCP
- Special Talk of Director (DSE), UCP on Sustainability and Green Metric at Voice of Capital (VOC) FM 97.6
- Seminar on Youth Development Program by WWF (World Wide Fund on Nature)
- Seminar on The United Nations Humanitarian vs Development System
- Special Talk of Director DSE, CUST on Royal News
- Awareness Session of Director(DSE), UCP about COVID-19 at VOC FM 97.6
- Session with Director (DSE), UCP with Vice Chancellor CUST on Preparing CUST for UN's Sustainability Agenda
- Observance of Sustainability Week at CUST

SELECTED PUBLICATIONS

- A. Hassau, "Dynamic Linkages between Oil Price Shocks and Equity Markets of Asia Pacific Rim," in *International Business & Economics Research Conference*, 2008.
- A. Hashmi, S. Ahmed, and I. Hassan, "Optimizing Pakistan's water economy using hydro-economic modeling," *Journal of Business & Economics*, vol. 11, no. 2, pp. 111-124, 2020.
- S. Janjua and I. Hassan, "Transboundary water allocation in critical scarcity conditions: a stochastic Bankruptcy approach," *Journal of Water Supply: Research and Technology-AQUA*, vol. 09, no. 3, pp. 224-237, 2020.
- S. Janjua, I. Hassan, M. Zarghami, and S. Islam, "Addressing the supply-demand gap in shared rivers using water diplomacy framework: utility of game theory in the Indus river within Pakistan," *Water Policy*, vol. 22, no. 5, pp. 789-810, 2020
- S. Janjua and I. Hassan, "Use of bankruptcy methods for resolving interprovincial water conflicts over transboundary river: Case study of Indus River in Pakistan," *River Research and Applications*, 2020.
- S. Janjua and I. Hassan, "Fuzzy AHP-TOPSIS multi-criteria decision analysis applied to the Indus Reservoir system in Pakistan," *Water Supply*, 2020.
- S. Ahmed, K. Muir, and H. Nadeem, "Relationship between foreign direct investment & financial market development-evidence from south Asian markets," *Journal of Independent Studies & Research: Management & Social Sciences & Economics*, vol. 17, no. 2, 2020.
- S. Ahmed, S. Bashir, and H. Abbas, "Making CPEC inclusive for informal workers", *Journal of Business Strategies*, 2020.
- M. H. Khan, A. Fraz, A. Hassan, and P. Abedifar, "Female board representation, risk taking and performance: Evidence from dual banking systems," *Finance Research Letters*, p. 101541, 2020.
- S. Saeed and A. Hassan, "Liquidity commonality risk and asset pricing in emerging and developed stock," *NUMJ International Journal of Business & Management*, vol. 19, no. 2, pp. 92-110, 2020.
- S. Ijaz, A. Hassan, A. Tarazi, and A. Fraz, "Linking bank competition, financial stability, and economic growth," *Journal of Business Economics and Management*, vol. 21, no. 1, pp. 200-221, 2020.
- A. Hashmi, S. Ahmed, and A. I. Bharti, "Using IBMR for provincial water distribution," in *International Sustainable Development Conference*, 2018.
- A. Hashmi, M. Farhan and A. I. Bharti, "Simulation and analysis of diffing oscillator using sliding mode control," in *International Conference on Communication, Computing and Digital Systems (C-CODE)*, pp. 326-330, 2017.



Center for Software Dependability (CSD)



GROUP INTRODUCTION

Center for Software Dependability (CSD) is a Research Group at Capital University of Science & Technology (CUST), Islamabad working in diverse areas within the domains of Software Dependability, with special focus on Software Reliability, Formal Methods, Model Driven Architecture, and Software Testing. The Center founded in 2003 has been working under broad domains of Software Testing and Quality Assurance, Model based Testing, and Software Fault Tolerance.

GROUP HEAD

Prof. Dr. Aamer Nadeem

Prof. Dr. Aamer Nadeem is Head of Software Engineering Program at Capital University of Science & Technology, Islamabad. He is also Head of the Center for Software Dependability (CSD) – a research group at CUST, working in the domains of Software Reliability, Software Fault Tolerance, Formal Methods and Safety-Critical Systems. Prof. Nadeem received his MSc degree in Computer Science from Quaid-e-Azam University (QAU), Islamabad, MS in Software Engineering from National University of Sciences and Technology (NUST), Islamabad and PhD in Computer Science from Mohammad Ali Jinnah University (MAJU), Islamabad. During his PhD, he also worked as a Visiting Scholar at the Chinese University of Hong Kong (CUHK) under a research collaboration. He has over 30 years of teaching, research and industry experience in Computer Science and Software Engineering. He has supervised 46 Masters and 3 PhD research theses in the areas of Software Testing, Fault Tolerance and Formal Methods. He has authored over 100 papers in reputable international Journals and Conferences. He is reviewer or Editorial Board member of several International Peer-reviewed Journals and Conferences. Dr. Nadeem is an Approved PhD Supervisor for scholars funded by indigenous fellowship schemes of the Higher Education Commission (HEC) of Pakistan. He is also a professional member of the Association for Computing Machinery (ACM).



RESEARCH AREAS

- Software Testing and Reliability
- Software Fault Tolerance
- Formal Methods and Safety Critical Systems
- Agent Oriented Computing
- Artificial Intelligence and Machine Learning

GROUP MEMBERS

1. Prof. Dr. Aamer Nadeem
2. Dr. Muddassar Azam Sindhu (QAU, Islamabad)
3. Mr. Nadeem Fakhar
4. Mr. Qamar-uz-Zaman
5. Mr. Muhammad Rizwan
6. Ms. Faezha Jafri
7. Mr. Muhammad Bilal Khan
8. Mr. Muhammad Shafiq
9. Mr. Fawad-ul-Hassan Gilani
10. Ms. Maria Sagheer
11. Ms. Shanza Aqed

MS/PHD ALUMNI

Dr. Muhammad Bilal Bashir

PhD Thesis Title: Test Data Generation for Evolutionary Mutation Testing of Object-Oriented Programs
Year: 2018

Dr. Shafiq ur Rehman

PhD Thesis Title: An Automated Approach to Model Based Testing of Multi-Agent Systems.
Year: 2017

Mr. Sarmaad Hassan

MS Thesis Title: Predicting the number of Software Faults using Significant Process and Code Metrics
Year: 2020

Ms. Ayesha Naseer

MS Thesis Title: A GUI Based Approach to Detect Energy Bugs in Android Applications
Year: 2020

Ms. Asia Shahab

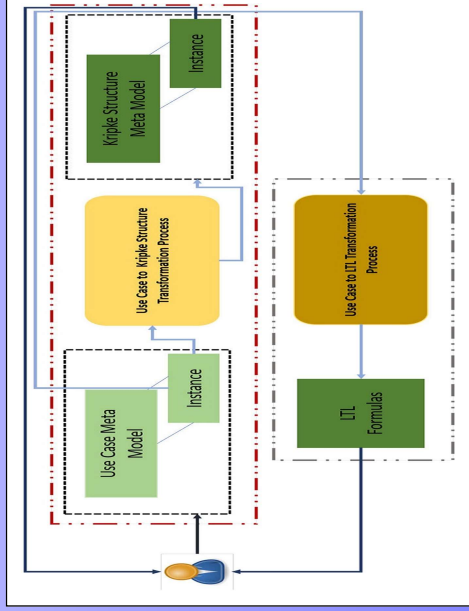
MS Thesis Title: A Static Analysis Based Approach to Detect Energy Bugs in Android Applications
Year: 2020

Ms. Sadaf Farooqi

MS Thesis Title: A Use Case Complexity Based Approach to Prioritize Test Cases for Software Product Line Testing
Year: 2020

Mr. Omaid Ghayyur

MS Thesis Title: Mutation Testing for Unity 3D
Year: 2018



SELECTED PUBLICATIONS

Journal Publications

- S. R. Aziz, T. A. Khan, T. Ahmed, and A. Nadeem, "Efficacy of Inheritance Aspect in Software Fault Prediction—A Survey Paper," *IEEE Access*, vol. 8, pp. 170518–170567, 2020.
- M. Rizwan, A. Nadeem, M. Iqbal, S. Sarwar, M. Safyan, and Z. U. Qayyum, "An Adaptive Software Fault Tolerant Framework for Ubiquitous Vehicular Technologies," *IEEE Communications Standards Magazine*, 2020.
- Q. U. Zaman, A. Nadeem, and M. A. Sindhu, "Formalizing the use case model: A model-based approach," *Plos one*, vol. 15, no. 4, p. e0231534, 2020.
- N. M. Minhas, S. Masood, K. Petersen, and A. Nadeem, "A systematic mapping of test case generation techniques using UML interaction diagram," *Journal of Software: Evolution and Process*, 2019.
- S. R. Aziz, T. Khan, and A. Nadeem, "Experimental validation of inheritance metrics' impact on software fault prediction," *IEEE Access*, vol. 7, pp. 85262–85275, 2019.
- M. Rizwan, A. Nadeem, and M. A. Sindhu, "Analyses of classifier's performance measures used in software fault prediction studies," *IEEE Access*, vol.7, pp. 82764–82775, 2019.
- S. U. Rehman, A. Nadeem, and M. A. Sindhu, "Towards automated testing of intelligent systems using prometheus design models," *The International Arab Journal of Information Technology*, vol. 16, no. 1, pp. 54–65, 2019.
- M. B. Bashir and A. "Nadeem: Improved Genetic Algorithm to Reduce Mutation Testing Cost," *IEEE Access*, vol. 5, pp. 3657–3674, 2017.
- S. Ahmed and A. Nadeem, "A Mobile Agent-Based Communication Protocol to Optimize Message Delivery Cost," *Journal of Systems and Software*, vol. 121, pp. 40–48, 2016.
- S. U. Rehman and A. Nadeem, "An Approach to Model Based Testing of Multiagent Systems," *The Scientific World Journal*, vol. 2015, Article ID. 925206, 2015.
- A. A. Haider, A. Nadeem, and S. Rafiq, "Multiple Objective Test Suite Optimization: A Fuzzy Logic Based Approach," *Journal of Intelligent and Fuzzy Systems*, vol. 27, no. 2, pp. 863–875, 2014.

Conference Publications

- M. Rizwan, A. Nadeem, and M. A. Sindhu, "Empirical Evaluation of Coupling Metrics in Software Fault Prediction," *17th International Bhurban Conference on Applied Sciences and Technology (IBCASCST 2020)*, Jan. 14–18, 2020, Islamabad, Pakistan.
- M. Rizwan, A. Nadeem, and M. A. Sindhu, "Theoretical Evaluation of Software Coupling Metrics," *17th International Bhurban Conference on Applied Sciences and Technology (IBCASCST 2020)*, Jan. 14–18, 2020, Islamabad, Pakistan.
- T. Afzal, A. Nadeem, M. A. Sindhu, and Q. Zaman, "Test Case Prioritization Based on Path Complexity," *17th International Conference on Frontiers of Information Technology (FIT 2019)*, Dec. 16–18, 2019, Islamabad, Pakistan.
- R. Butool, A. Nadeem, M. A. Sindhu, and Q. Zaman, "Improving Requirements Coverage in Test Case Prioritization for Regression Testing," *22nd IEEE International Multiplic Conference (INMIC 2019)*, held on November 29–30, 2019, Islamabad, Pakistan.
- M. Muzamal and A. Nadeem, "Improving test adequacy assessment by novel JavaScript mutation operators," *16th International Bhurban Conference on Applied Sciences and Technology (IBCASCST 2019)*, Jan. 9–12, 2019, Islamabad, Pakistan.



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

Capital University of Science and Technology (CUST) Research Report (2020) – Faculty of Computing

S. No	Faculty Name	Papers Published in 2020	Impact Factor in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. M. Abdul Qadir	02	3.810	-	04
2.	Dr. Nayyer Masood	03	8.035	-	02
3.	Dr. Aamer Nadeem	04	7.663	-	03
4.	Dr. Amir Qayyum	01	3.745	-	02
5.	Dr. Qammar Mehmood	-	-	-	02
6.	Dr. Abdul Basit	-	-	-	03
7.	Dr. Masroor Ahmed	01	3.745	-	01
8.	Dr. Yasir Noman	-	-	-	-
9.	Dr. Shahid Iqbal Malik	02	8.797	-	-
10.	Dr. Nadeem Anjum	02	6.219	-	01
11.	Dr. Maryam Abdul Ghafoor	-	-	-	-
12.	Dr. Azhar Mahmood	-	-	-	-
13.	Dr. Abdul R. Kashif	-	-	-	04
14.	Dr. M. Sagheer	06	6.974	01	03
15.	Dr. Shafqat Hussain	09	16.223	03	08
16.	Dr. Rashid Ali	06	11.483	-	07

17.	Dr. Muhammad Afzal	03	5.973	-	01
18.	Dr. Dure-e-Shehwar	02	0.619	-	03
19.	Dr. Samina Rashid	-	-	-	04

Total Number of Research Papers by Faculty of Computing	33
Total Impact Factor	75.963

Faculty of Computing

S. No	Faculty Name	Papers Published in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. M. Abdul Qadir	<ol style="list-style-type: none"> R. Muntaz and M. A. Qadir, "CustNER: a rule-based named-entity recognizer with improved recall," International Journal on Semantic Web and Information Systems, vol. 16, no. 3, pp. 110–127, 2020 IF=1.742, Category-Nil N. Ikram, M. A. Qadir, and M. T. Afzal, "SimExact – An efficient method to compute function similarity between proteins using gene ontology," Current Bioinformatics, vol. 15, no. 4, pp. 318–327, 2020 IF=2.068, Category-Y 	Nil	<ol style="list-style-type: none"> CiFE - Citation Function Extraction from Citations' Context Handling Family Relations Inconsistencies in LoD (DBpedia) Performance Analysis of Scheduling Schemes for Cloud Computing Resources An Efficient Bright Star String Searching Algorithms
2.	Dr. Nayyer Masood	<ol style="list-style-type: none"> L. Zafar and N. Masood, "Impact of field of study trend on scientific articles," IEEE Access, vol. 8, pp. 128 295–128 307, 2020 IF=3.745, Category-W S. Ayaz and N. Masood, "Comparison of researchers' impact indices," PLOS ONE, vol. 15, no. 5, pp. 1–15, 2020 IF=2.740, Category-W S. Masood, M. A. Islam, M. T. Afzal, and N. Masood, "A comprehensive 	Nil	<ol style="list-style-type: none"> Handling Class Imbalance Data using Class Label Prediction Student Performance Prediction by Using Cluster Analysis

		author ranking evaluation of network and bibliographic indices,” Malaysian Journal of Library & Information Science, vol. 25, no. 1, pp. 31–45, 2020 IF=1.550, Category-W		
3.	Dr. Aamer Nadeem	<p>1. N. M. Minhas, S. Masood, K. Petersen, and A. Nadeem, “A systematic mapping of test case generation techniques using uml interaction diagrams,” Journal of Software: Evolution and Process, vol. 32, no. 6, 2020 IF=1.178, Category-X</p> <p>2. M. Rizwan, A. Nadeem, M. Iqbal, S. Sarwar, M. Safyan, and Z. Qayyum, “An adaptive software fault tolerant framework for ubiquitous vehicular technologies,” IEEE Communications Standards Magazine, vol. 4, no. 4, pp. 26-32, 2020 IF=Nil, Category-X</p> <p>3. S. R. Aziz, T. A. Khan, and A. Nadeem, “Efficacy of inheritance aspect in software fault prediction—a survey paper,” IEEE Access, vol. 8, pp. 170 548–170 567, 2020 IF=3.745, Category-W</p>	Nil	<p>1. A Static Analysis Based Approach to Detect Energy Bugs in Android Applications</p> <p>2. A GUI Based Approach to Detect Energy Bugs in Android Applications</p> <p>3. Predicting the Number of Software Faults Using Significant Process and Code Metrics</p>

		<p>4. Q. u. Zaman, A. Nadeem, and M. A. Sindhu, "Formalizing the use case model: A model-based approach," Plos one, vol. 15, no. 4, 2020 IF=2.740, Category-W</p>		
4.	Dr. Amir Qayyum	<p>1. S. S. A. Gilani, A. Qayyum, R. N. B. Rais, and M. Bano, "SDNMesh: an SDN based routing architecture for wireless mesh networks," IEEE Access, vol. 8, pp. 136769–136781, 2020 IF=3.745, Category-W</p>	Nil	<p>1. A NAT Traversal Method for Interconnecting Networks in an SDN Environment</p> <p>2. Efficient Charging and Scheduling of Electric Vehicles through Load Forecasting Models</p>
5.	Dr. Qammar Mehmood	Nil	Nil	<p>1. A Multilayer Encryption Model to Protect Healthcare Data in Cloud Environment</p> <p>2. A Comparative Analysis of Based Survey of Authentication and Encryption Schemes used in VANETs</p>
6.	Dr. Abdul Basit	Nil	Nil	<p>1. Image Fusion in Spatial Domain using Local Binary Pattern</p> <p>2. Genetic Algorithm based Multi-focus Image Fusion using Local Features</p>

			3. Task Optimization in Cloud Computing	Scheduling in Cloud Computing
7.	Dr. Mastroor Ahmed	<p>1. S. Mehrban, M. W. Nadeem, M. Hussain, M. M. Ahmed, O. Hakeem, S. Saqib, M. M. Kiah, F. Abbas, M. Hassan, and M. A. Khan, "Towards secure fintech: A survey, taxonomy, and open research challenges," IEEE Access, vol. 8, pp. 23 391–23 406, 2020 IF=3.745, Category-W</p>	Nil	1. Assessment of Author Ranking Indices based on Multi-authorship
8.	Dr. Yasir Noman	Nil	Nil	Nil
9.	Dr. Shahid Iqbal Malik	<p>1. M. S. I. Malik and A. Hussain, "Exploring the influential reviewers, review and product determinants for review helpfulness," Artificial Intelligence Review, vol. 53, no. 1, pp. 407–427, 2020 IF=5.747, Category-W</p> <p>2. M. S. I. Malik, "Predicting users' review helpfulness: the role of significant review and reviewer characteristics," Soft Computing, vol. 24, pp. 1–16, 2020 IF=3.050, Category-W</p>	Nil	Nil
10.	Dr. Nadeem Anjum	1. W. Sultan, N. Anjum, M. Stansfield, and N. Ramzan, "Hybrid local and global deep learning architecture for	Nil	1. Salient Object Detection with Deep Learning

		salient-object detection,” Applied Sciences, vol. 10, no. 23, p. 8754, 2020 IF=2.474, Category-X		
11.	Dr. Maryam Abdul Ghafoor	2. S. Bibi, N. Anjum, T. Amjad, G. McRobbie, and N. Ramzan, “Human interaction anticipation by combining deep features and transformed optical flow components,” IEEE Access, vol. 8, pp. 137 646–137 657, 2020 IF=3.745, Category-W	Nil	Nil
12.	Dr. Azhar Mahmood	Nil	Nil	Nil
13.	Dr. Abdul R. Kashif	Nil	Nil	<ol style="list-style-type: none"> 1. Regions of Central Configurations in a Symmetric 4+1 Body Problem 2. Planar Central Configurations of Restricted Six-Body Problems 3. Central Configuration in a Symmetric Five Body Problem 4. Restricted Trapezoid Five-Body Problem

14.	Dr. M. Sagheer	<p>1. T. Sajid, M. Sagheer, and S. Hussain, "Role of maxwell velocity and smoluchowski temperature jump slip boundary conditions to non-newtonian carreau fluid," Frontiers in Heat and Mass Transfer (FHMT), vol. 14, 2020 IF=Nil, Category-X</p> <p>2. T. Sajid, M. Sagheer, S. Hussain, and F. Shahzad, "Impact of double-diffusive convection and motile gyrotactic microorganisms on magnetohydrodynamics bioconvection tangent hyperbolic nanofluid," Open Physics, vol. 18, no. 1, pp. 74–88, 2020 IF=0.963, Category-X</p> <p>3. I. Rashid, M. Sagheer, and S. Hussain, "Exact solution of stagnation point flow of mhd cu–h2o nanofluid induced by an exponential stretching sheet with thermal conductivity," Physica Scripta, vol. 95, no. 2, 2020 IF=1.985, Category-W</p> <p>4. T. Sajid, M. Sagheer, and S. Hussain, "Impact of temperature-dependent heat source/sink and variable species diffusivity on radiative reiner–philippoff fluid," Mathematical</p>	<p>1. Entropy Analysis of Peristalsis Fluid Models</p>	<p>1. Impact of Slip Wall on MHD Casson Nanofluid in the Presence of Viscous Dissipation and Thermal Radiation</p> <p>2. A Carreau Nanofluid Flow over a Non-Linearly Stretching Sheet</p> <p>3. Heat Transfer and Boundary Layer Flow of Casson Fluid over a Non-Linear Stretching Sheet</p>
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15.	Dr. Shafqat Hussain	<p>Problems in Engineering, vol. 2020, pp. 1–16, 2020 IF=1.009, Category-W</p> <p>5. M. Abrar, M. Sagheer, and S. Hussain, “Entropy generation during peristaltically flowing nanofluid in an axisymmetric channel with flexible walls,” <i>Physica Scripta</i>, vol. 95, no. 3, 2020 IF=1.985, Category-W</p> <p>6. N. M. Akmal, Sagheer, S. Hussain, and A. Kamran. "Study of micropolar nanofluids with power-law spin gradient viscosity model by the Keller box method," <i>Canadian Journal of Physics</i>, vol. 98, no. 1, pp. 16-27, 2020 IF=1.032, Category-X</p>	<p>1. Single Phase Analysis of MHD Convective Heat Transport in NanoFluid Using Finite Difference Method</p> <p>2. Effect of Linear Thermal Radiation and Magnetohydrodynamics on Non-Newtonian Fluids</p> <p>3. Flow and Heat Transfer Analysis of MHD Upper-</p>	<p>1. Effect of Inclined Magnetic Field and Higher Order Chemical Reaction on Stagnation Point Nanofluid Flow</p> <p>2. Effects of an Inclined Magnetic Field on the Unsteady Squeezing Flow between Parallel Plates with Suction/Injection</p>
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		<p>nanofluid,” International Communications in Heat and Mass Transfer, vol. 119, 2020 IF=3.971, Category-W</p> <p>3. S. Hussain, T. Armaghani, and M. Jamal, “Magnetoconvection and entropy analysis in t-shaped porous enclosure using finite element method,” Journal of Thermophysics and Heat Transfer, vol. 34, no. 1, pp. 203–214, 2020 IF=1.307, Category-W</p> <p>4. T. Sajid, M. Sagheer, and S. Hussain, “Role of maxwell velocity and smoluchowski temperature jump slip boundary conditions to non-newtonian carreau fluid,” Frontiers in Heat and Mass Transfer (FHMT), vol. 14, 2020 IF=Nil, Category-X</p> <p>5. T. Sajid, M. Sagheer, S. Hussain, and F. Shahzad, “Impact of double-diffusive convection and motile gyrotactic microorganisms on magnetohydrodynamics bioconvection tangent hyperbolic nanofluid,” Open Physics, vol. 18, no. 1, pp. 74–88, 2020 IF=0.963, Category-X</p>	<p>Convected Maxwell Fluid over a Sheet with Non-Fourier’s Heat Law</p>	<p>3. Numerical Analysis of MHD Heat Transfer and Nanofluid Flow over a Porous Plate with Radiation and Joule Heating Effects</p> <p>4. MHD Flow of Nanofluid with Joule Heating and Arrhenius Activation Energy</p> <p>5. MHD Squeezing Flow of Maxwell Nanofluid with Thermal Radiation</p> <p>6. Heat and Mass Transfer Analysis of MHD Casson Fluid with Soret and Dufour Effect</p> <p>7. Influence of Inclined Magnetic Field on Mixed Convective Nanofluid Flow Inside Porous Cavity</p> <p>8. Mixed Convection Nanofluid Flow with Inclined Magnetic Field and Joule Heating Effects over Porous Backward Facing Step</p>
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		<p>6. I. Rashid, M. Sagheer, and S. Hussain, "Exact solution of stagnation point flow of mhd cu-h₂o nanofluid induced by an exponential stretching sheet with thermal conductivity," <i>Physica Scripta</i>, vol. 95, no. 2, 2020 IF=1.985, Category-W</p> <p>7. T. Sajid, M. Sagheer, and S. Hussain, "Impact of temperature-dependent heat source/sink and variable species diffusivity on radiative reiner-philippoff fluid," <i>Mathematical Problems in Engineering</i>, vol. 2020, pp. 1-16, 2020 IF=1.009, Category-W</p> <p>8. M. Abrar, M. Sagheer, and S. Hussain, "Entropy generation during peristaltically flowing nanofluid in an axisymmetric channel with flexible walls," <i>Physica Scripta</i>, vol. 95, no. 3, 2020 IF=1.985, Category-W</p> <p>9. N. M. Akmal, Sagheer, S. Hussain, and A. Kamran. "Study of micropolar nanofluids with power-law spin gradient viscosity model by the Keller box method," <i>Canadian Journal of Physics</i>, vol. 98, no. 1, pp. 16-27, 2020 IF=1.032, Category-X</p>		
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16.	Dr. Rashid Ali	<ol style="list-style-type: none"> 1. M. Zia and R. Ali, "A multi recipient aggregate signcryption scheme based on elliptic curve," <i>Wireless Personal Communications</i>, vol. 115, no. 2, pp. 1465–1480, 2020 IF=1.061, Category-X 2. M. S. Ashraf, R. Ali, and N. Hussain, "New fuzzy fixed point results in generalized fuzzy metric spaces with application to integral equations," <i>IEEE Access</i>, vol. 8, pp.91653–91660, 2020 IF=3.745, Category-W 3. T. S. Ali and R. Ali, "A new chaos based color image encryption algorithm using permutation substitution and boolean operation," <i>Multimedia Tools and Applications</i>, vol. 79, pp. 19853–19873, 2020 IF=2.313, Category-W 4. T. S. Ali and R. Ali, "A novel medical image signcryption scheme using tfts and henon chaotic map," <i>IEEE Access</i>, vol. 8, pp. 71974–71992, 2020 IF=3.745, Category-W 5. M. Anwar, R. Ali. Dur-e Shehwar Sagheer, and N. Hussain, "Wardowski 	Nil	<ol style="list-style-type: none"> 1. Best Proximity Points for Suzuki-Edelstein Proximal Contraction in b-Metric Space 2. Visually Meaningful Image Encryption 3. Digital Signature Based On Matrices Using Tropical Algebra 4. Cryptanalysis of Matrix based Digital Signature and Encryption Schemes based on Block Cipher 5. Cryptanalysis of the Encryption Scheme based on Advanced Hill Cipher Algorithm 6. Cone Extended b-Metric Space Over Banach Algebra 7. A Computational Package for Working with Elliptic Curve Groups

		<p>type α-contractive approach for nonself multivalued mappings,” University Polytechnica Of Bucharest Scientific Bulletin-Series A-Applied Mathematics and Physics, vol. 82, no. 1, pp. 69–78, 2020 IF=0.619, Category-Y</p> <p>6. M. Anwar, D. E. S. Sagheer, and R. Ali, “Fixed point theorems for (α, F) contractive mappings in extended b-metric spaces,” Journal of Mathematical Analysis, vol. 11, no.2, pp. 43–51, 2020 IF=Nil, Category-Nil</p>		
17.	Dr. Muhammad Afzal	<p>1. M. Afzal, J. U. Satti, and R. Nawaz, “Scattering characteristics of non-planar trifurcated waveguides,” Meccanica, vol. 55, pp. 977–988, 2020 IF=2.153, Category-W</p> <p>2. S. Shafique, M. Afzal, and R. Nawaz, “On the attenuation of fluid–structure coupled modes in a non-planar waveguide,” Mathematics and Mechanics of Solids, vol. 25, no. 10, pp. 1831–1850, 2020 IF=2.040, Category-W</p> <p>3. M. Afzal and S. Shafique, “Attenuation analysis of flexural modes with</p>	Nil	1. Acoustic Propagation and Scattering through the Lined Cavities

18.	Dr. Dure-e-Shehwar	<p>absorbent lined flanges and different edge conditions,” The Journal of the Acoustical Society of America, vol. 148, no. 1, pp. 85–99, 2020 IF=1.780, Category-W</p> <p>1. M. Anwar, D. E. S. Sagheer, and R. Ali, “Fixed point theorems for (α, F) contractive mappings in extended b-metric spaces,” Journal of Mathematical Analysis, vol. 11, no. 2, pp. 43–51, 2020 IF=Nil, Category-Nil</p> <p>2. M. Anwar, R. Ali. Dur-e Shehwar Sagheer, and N. Hussain, “Wardowski type α-fcontractive approach for nonself multivalued mappings,” University Polytechnica Of Bucharest Scientific Bulletin-Series A-Applied Mathematics and Physics, vol. 82, no. 1, pp. 69–78, 2020 IF=0.619, Category-Y</p>	Nil	<p>1. Effects of Chemical Reaction on Nanofluid Flow Past a Stretching Sheet with Thermal Radiations</p> <p>2. An Unsteady Squeezing Casson Fluid Flow Under the Effect of Darcy Number</p> <p>3. The Study of Heat and Mass Transfer of Upper Convected Maxwell Fluid Between Two Parallel Plates</p>
19.	Dr. Samina Rashid	Nil	Nil	<p>1. Multivalued Fractals in Cone b-Metric Spaces</p> <p>2. Relation Theoretic Coincidence and Common Fixed Point Results under $(Fw, R)g$-Contractions</p> <p>3. Key Exchange, Encryption Decryption and Proxy Re-</p>

				encryption Pseudoinverses	using
				4. Some Fixed Point Theorems in Partial Extended b -Metric Spaces	



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

Capital University of Science and Technology (CUST) Research Report (2020) – Faculty of Engineering

S. No	Faculty Name	Papers Published in 2020	Impact Factor in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Ishtiaq Hassan	07	9.648	-	03
2.	Dr. Majid Ali	05	22.842	-	12
3.	Dr. Shuja Safdar	01	-	-	02
4.	Dr. Usman Farooqi	-	-	-	-
5.	Dr. M. Mansoor Ahmed	03	5.026	-	-
6.	Dr. Imtiaz Ahmed Taj	04	7.779	-	01
7.	Dr. Noor M. Khan	03	5.867	01	01
8.	Dr. Aamer Iqbal Bhatti	05	15.132	03	-
9.	Dr. Fazal u Rehman	01	3.745	-	01
10.	Dr. Raza Samar	02	12.207	01	-
11.	Dr. M. Ashraf	-	-	01	01
12.	Dr. M. Tahir Awan	01	2.479	-	-
13.	Dr. Umer Amir Khan	01	3.745	-	03
14.	Dr. Mahabat Khan	02	9.450	-	01
15.	Dr. Khawar Naveed	-	-	-	01
16.	Dr. Waqas Akbar Lughmani	-	-	-	01

17.	Dr. Salman Sagheer Warsi	02	5.266	-	01
18.	Dr. M. Irfan	-	-	-	01
19.	Dr. Irfan Anjum	02	-	-	02
20.	Dr. Javed Haider	-	-	-	-
21.	Dr. Taiba Zahid	-	-	-	-

Total Number of Research Papers by Faculty of Engineering	39
Total Impact Factor	85.013

Faculty of Engineering

S. No	Faculty Name	Papers Published in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Ishtiaq Hassan	<p>1. E. Aamir and I. Hassan, "The impact of climate indices on precipitation variability in baluchistan, pakistan," Tellus A: Dynamic Meteorology and Oceanography, vol. 72, no. 1, pp. 1–46, 2020 IF=1.932, Category-X</p> <p>2. S. Janjua, I. Hassan, and S. Islam, "Role and relevance of three enabling conditions to resolve inter-provincial water conflicts in the indus basin within pakistan," Water Policy, vol. 22, no. 5, pp. 811–824, 2020 IF=1.093, Category-W</p> <p>3. M. Hassan and I. Hassan, "Improving ann-based streamflow estimation models for the upper indus basin using satellite derived snow cover area," Acta Geophysica, vol. 68, no. 6, pp. 1791–1801, 2020 IF=1.395, Category-Nil</p> <p>4. S. Janjua, I. Hassan, M. Zarghami, and S. Islam, "Addressing supply-demand gap in shared rivers using water diplomacy framework: utility of game theory in the indus river within</p>	Nil	<p>1. Evaluation of Hydraulic Condition of Soan River at Downstream of Chirah Station to Plan and Propose Water Turbine</p> <p>2. Hydraulic and Financial Comparison of Combined and Separate Sewer Systems for a Residential Colony in Islamabad</p> <p>3. Hydraulic and Financial Comparison of Combined and Separate Sewer Systems for a Residential Colony in Islamabad</p>

		<p>pakistan,” Water Policy, vol. 22, no. 5, pp. 789–810, 2020 IF=1.093, Category-W</p> <p>5. S. Janjua and I. Hassan, “Fuzzy ahptopsis multi-criteria decision analysis applied to the indus reservoir system in pakistan,” Water Supply, vol. 20, no. 5, pp. 1933–1949, 2020 IF=0.90, Category-Nil</p> <p>6. S. Janjua and I. Hassan, “Transboundary water allocation in critical scarcity conditions: a stochastic bankruptcy approach,” Journal of Water Supply: Research and Technology-AQUA, vol. 69, no. 3, pp. 224–237, 2020 IF=1.319, Category-X</p> <p>7. S. Janjua and I. Hassan, “Use of bankruptcy methods for resolving interprovincial water conflicts over transboundary river: Case study of indus river in pakistan,” River Research and Applications, vol. 36, no. 7, pp. 1334–1344, 2020 IF=1.916, Category-W</p>		
2.	Dr. Majid Ali	1. M. Khan and M. Ali, “Optimization of concrete stiffeners for confined brick masonry structures,” Journal of Building Engineering, vol. 32, 2020	Nil	1. Out-of-plane Behavior of Prototype Interlocking Wall with Plastic-block

		<p>IF=3.379, Category-W</p> <p>2. S. Ahmed and M. Ali, "Use of agriculture waste as short discrete fibers and glass-fiberreinforced-polymer rebars in concrete walls for enhancing impact resistance," Journal of Cleaner Production, vol. 268, 2020 IF=7.246, Category-W</p> <p>3. M. Khan, M. Cao, and M. Ali, "Cracking behaviour and constitutive modelling of hybrid fibre reinforced concrete," Journal of Building Engineering, vol. 30, 2020 IF=3.379, Category-W</p> <p>4. M. Khan, A. Rehman, and M. Ali, "Efficiency of silica-fume content in plain and natural fiber reinforced concrete for concrete road," Construction and Building Materials, vol. 244, 2020 IF=4.419, Category-W</p> <p>5. Qamar, F., Thomas, T. and M. Ali, "Improvement in lateral resistance of mortar-free interlocking wall with plaster having natural fibres," Construction and Building Materials, vol. 234, 2020. IF=4.419, Category-W</p>		<p>Opening Under Harmonic Loading</p> <p>2. Investigation of Jute Fiber Reinforced Concrete Having GFRP Rebars in Slabs Under Impact Loading</p> <p>3. Experimental Investigation on Properties of Fiber Reinforced Concrete Related to Bridge Piers</p> <p>4. Sustainable Framework on Hybrid Fiber Reinforced Concrete to Control water losses in Canal Lining</p> <p>5. Dynamic Response of Interlocking Plastic-Block Walls with Diaphragm using Numerical Approach</p> <p>6. Out-of-plane Behavior of Prototype Interlocking Plastic-block Solid Wall Under Harmonic Loading</p> <p>7. Effect of Block-Return on Out-of-Plane Behavior of Interlocking Plastic-Block</p>
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				<p>Walls under Harmonic Loading</p> <p>8. Effectiveness of Jute Fibers and GFRP Rebars on the Structural Behavior of Concentric Rectangular Concrete Columns</p> <p>9. Use of Jute Fibre Reinforced Concrete having GFRP Rebars in Thin Shear Wall to Avoid Catastrophic Failure</p> <p>10. Structural Behavior of Eccentric Square Columns having Jute Fibre Reinforced Concrete and GFRP Rebars</p> <p>11. Impact Resistance of Concrete Wall having Jute Fibers and GFRP Rebars</p> <p>12. Comparative Analysis and Design of Elevated Water Tank using Conventional and BIM Approach</p>
3.	Dr. Shuja Safdar	1. A. A. Khan, M. U. Zaheer, S. Asghar, and S. S. S. Gardezi, "Green rating assessment of a residential building in pakistan using leed's," Open Journal of	Nil	1. Comparative Analysis of Green Building Rating Systems for Sustainability Assessment of a Residential Building

		Science and Technology, vol. 3, no. 2, pp. 126–139, 2020 IF=Nil, Category-Nil		2. Energy Optimization of a Residential High Rise Building using BIM for Sustainability
4.	Dr. Usman Farooqi	Nil	Nil	Nil
5.	Dr. M. Mansoor Ahmed	<ol style="list-style-type: none"> 1. K. H. S. Karimov, M. M. Ahmed, M. Saleem, S. Shafique, M. Akmal et al., “Orange dye based field effect transistor as humidity sensor,” <i>Optoelectronics and Advanced Materials-Rapid Communications</i>, vol. 14, no. 9-10, pp. 416–420, 2020 IF=0.445, Category-X 2. U. F. Ahmed, M. M. Ahmed, and Q. D. Memon, “A modified analytical model for AlGaIn/GaN FinFETs I–V characteristics,” <i>Semiconductor Science and Technology</i>, vol. 35, no. 3, pp. 035 002–035 011, 2020 IF=2.361, Category-W 3. S. Shafique, K. S. Karimov, M. Abid, M. M. Ahmed, and K. M. Akhmedov, “Carbon nanotubes, orange dye, and graphene powder based multifunctional temperature, pressure, and displacement sensors,” <i>Journal of Materials Science: Materials in</i> 	Nil	Nil

		<p>Electronics, vol. 31, pp. 8893–8899, 2020 IF=2.220, Category-X</p>		
<p>6.</p> <p>Dr. Imtiaz Ahmed Taj</p>		<p>1. A. u. Rehman, N. Ali, I. Taj, M. Sajid, K. S. Karimov et al., “An automatic mass screening system for cervical cancer detection based on convolutional neural network,” Mathematical Problems in Engineering, vol. 2020, 2020 IF=1.009, Category-W</p> <p>2. M. Shafiq, I. A. Taj, M. Ghafoor, S. A. Tariq, A. Abbas, and A. Y. Zomaya, “Accelerating fingerprint identification using fpga for large-scale applications,” Journal of Parallel and Distributed Computing, vol. 141, pp. 35–48, 2020 IF=2.296, Category-W</p> <p>3. M. Ghafoor, S. A. Tariq, I. Taj, N. Jafri, and T. Zia, “Robust palmprint identification using efficient enhancement and two-stage matching technique,” IET Image Processing, vol.14, no. 7, pp. 2333-2342, 2020 IF=1.995, Category-X</p> <p>4. M. Tahir, I. A. Taj, P. A. Assuncao, and M. Asif, “Low complexity high efficient coding of light fields using ensemble classifiers,” Journal of Visual</p>	<p>Nil</p>	<p>1. Monocular Depth Perception Using Deep Learning</p>

		Communication and Image Representation, vol. 66, p. 102742, 2020 IF=2.479, Category-W		
7.	Dr. Noor M. Khan	<p>1. H. Raza and N. M. Khan, "Tracking performance of robust rls algorithm for mimo channel estimation," Wireless Personal Communications, vol. 111, no. 1, pp. 395–409, 2020 IF=1.061, Category-X</p> <p>2. M. Y. M. Mirza and N. M. Khan, "G2A communication channel modeling and characterization using confocal prolates," Wireless Personal Communications, vol. 115, no. 1, pp. 745–787, 2020 IF=1.061, Category-X</p> <p>3. R. Saadia and N. M. Khan, "Single carrier-frequency division multiple access radar: Waveform design and analysis," IEEE Access, vol. 8, pp. 35 742–35 751, 2020 IF=3.745, Category-W</p>	<p>1. Modeling and Characterization of Ground-to-Air Communication Channel</p> <p>1. Validation of Pathloss Models Through Field Measurements</p>	
8.	Dr. Aamer Iqbal Bhatti	<p>1. M. Kamal Mazhar, M. J. Khan, A. I. Bhatti, and N. Naseer, "A novel roll and pitch estimation approach for a ground vehicle stability improvement using a low cost IMU," Sensors, vol. 20, no. 2, p. 340, 2020 IF=3.265, Category-W</p>	<p>1. Improved Determination Using Low-Cost MEMS Sensors</p> <p>2. Control Oriented Dosage Design for p53 Revival</p>	Nil

		<p>2. A. Hanif, Q. Ahmed, A. I. Bhatti, and G. Rizzoni, "A unified control framework for traction machine drive using lqv based field-oriented control," <i>Journal of Dynamic Systems, Measurement, and Control</i>, vol. 142, no. 10, 2020 IF=1.304, Category-W</p> <p>3. S. Ullah, Q. Khan, A. Mehmood, and A. I. Bhatti, "Robust backstepping sliding mode control design for a class of underactuated electro-mechanical nonlinear systems," <i>Journal Of Electrical Engineering & Technology</i>, vol. 15, pp. 1821–1828, 2020 IF=0.736, Category-X</p> <p>4. S. B. Javed, A. A. Uppal, R. Samar, and A. I. Bhatti, "Design and implementation of multi-variable h_∞ robust control for the underground coal gasification project thar," <i>Energy</i>, vol. 216, 2020 IF=6.082, Category-W</p> <p>5. R. Ara, U. A. Khan, A. I. Bhatti, and B. W. Lee, "A reliable protection scheme for fast dc fault clearance in a vsc-based meshed mtde grid," <i>IEEE Access</i>, vol. 8, pp. 88188–88199, 2020</p>	<p>3. Unified Framework for Detection and Mitigation of Cyclic Torque Imbalance in Gasoline Engines</p>	
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		IF=3.745, Category-W		
9.	Dr. Raza Samar	<p>1. S. B. Javed, A. A. Uppal, R. Samar, and A. I. Bhatti, "Design and implementation of multi-variable h∞ robust control for the underground coal gasification project that," Energy, vol. 216, 2020 IF=6.082, Category-W</p> <p>2. Z. Masood, R. Samar, and M. A. Z. Raja, "Design of fractional order epidemic model for future generation tiny hardware implants," Future Generation Computer Systems, vol. 106, pp. 43–54, 2020 IF=6.125, Category-W</p>	1. Dynamics of Epidemic Computer Virus Models	Nil
10.	Dr. Fazal u Rehman	<p>1. F. U. Rehman, M. R. Mufti, S. U. Din, H. Afzal, M. I. Qureshi, and D. M. Khan, "Adaptive smooth super-twisting sliding mode control of nonlinear systems with unmatched uncertainty," IEEE Access, vol. 8, pp. 177 932–177 940, 2020 IF=3.745, Category-W</p>	Nil	<p>1. Synchronization and Anti-synchronization of Financial Chaotic Systems Using Sliding Mode Control Technique</p>
11.	Dr. M. Ashraf	Nil	1. Energy Optimization with Bio-Inspired Heuristics Techniques in Smart Grid	1. Photovoltaic Power Forecast in an Energy Management System for a Hybrid Microgrid
12.	Dr. M. Tahir Awan	<p>1. M. Tahir, I. A. Taj, P. A. Assuncao, and M. Asif, "Low complexity high</p>	Nil	Nil

13.	Dr. Umer Amir Khan	<p>efficient coding of light fields using ensemble classifiers,” Journal of Visual Communication and Image Representation, vol. 66, p. 102742, 2020 IF=2.479, Category-W</p> <p>1. R. Ara, U. A. Khan, A. I. Bhatti, and B. W. Lee, “A reliable protection scheme for fast dc fault clearance in a vsc-based meshed mtde grid,” IEEE Access, vol. 8, pp. 88188–88199, 2020 IF=3.745, Category-W</p>	Nil	<p>1. A Modified Perturb and Observe Maximum Power Point Tracking Technique for Handling Partial Shading</p> <p>2. Harmonic and Switching Loss Analysis of Improved Space Vector Modulation for Modular Multilevel Converters</p> <p>3. Implementation of SCSM in Modular Multilevel HVDC Converter with Modified Controller using New Logic Gate Converter for DC Fault Blocking Capability</p>
14.	Dr. Mahabat Khan	<p>1. R. Sabir, M. M. Khan, N. A. Sheikh, I. U. Ahad, and D. Brabazon, “Assessment of thermo-hydraulic performance of inward dimpled tubes with variation in angular orientations,” Applied Thermal Engineering, vol. 170, 2020 IF=4.725, Category-W</p>	Nil	<p>1. Heat Transfer Enhancement of Latent Thermal Energy Storage System Using Multiple Tubes and Modified Shell Designs</p>

			2. L. A. Khan and M. M. Khan, "Role of orientation of fins in performance enhancement of a latent thermal energy storage unit," Applied Thermal Engineering, vol. 175, 2020 IF=4.725, Category-W			
15.	Dr. Khawar Naveed		Nil	Nil	1. Tank Gun Stabilization Using Mathematical Modeling	
16.	Dr. Waqas Akbar Lughmani		Nil	Nil	1. Design and Analysis of Composite Leaf Spring	
17.	Dr. Salman Sagheer Warsi		1. S. S. Warsi, R. Ahmad, S. H. I. Jaffery, M. H. Agha, and M. Khan, "Development of specific cutting energy map for sustainable turning: a study of al 6061 t6 from conventional to high cutting speeds," The International Journal of Advanced Manufacturing Technology, vol. 106, no. 7, pp. 2949–2960, 2020 IF=2.633, Category-W 2. M. A. Khan, S. H. I. Jaffery, M. Khan, M. Younas, S. I. Butt, R. Ahmad, and S. S. Warsi, "Multi-objective optimization of turning titanium-based alloy ti-6al-4v under dry, wet, and cryogenic conditions using gray relational analysis (GRA)," The International Journal of Advanced Manufacturing Technology, vol. 106, no. 9-10, pp. 3897–3911, 2020	Nil	1. Sustainable Supplier Selection and Order Allocation Using Fuzzy Multicriteria Decision Making and Multi Objective Optimization	

		IF=2.633, Category-W		
18.	Dr. M. Irfan	Nil	Nil	1. Numerical Study to Enhance the Melting and Solidification of Phase Change Material Using Branched Fins and Nano-Particles
19.	Dr. Irfan Anjum	<p>1. I. A. Manarvi and N. M. Matta, "Investigating information needs of saudi diabetic patients," Current Diabetes Reviews, vol. 15, no. 2, pp. 149–157, 2020 IF=Nil, Category-Y</p> <p>2. I. A. Manarvi and N. M. Matta, "Design and development of key chain held insulin injectable device." Current Diabetes Reviews, vol. 16, 2020 IF=Nil, Category-Y</p>	Nil	<p>1. An Investigation into Causes of Delays in Construction Projects of Pakistan</p> <p>2. An Investigation into Causes of Accidents in Construction Projects of Pakistan</p>
20.	Dr. Javed Haider	Nil	Nil	Nil



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

Capital University of Science and Technology (CUST) Research Report (2020) - Faculty of Health & Life Sciences

S. No	Faculty Name	Papers Published in 2020	Impact Factor in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Sahar Fazal	02	2.325	-	05
2.	Dr. Shaukat Iqbal	05	9.267	01	04
3.	Dr. S. Marriam Bakhtiar	05	5.637	-	04
4.	Dr. Erum Dilshad	07	9.297	-	06
5.	Dr. Arshia Amin Butt	01	1.798	-	05

Total Number of Research Papers by Faculty of Health & Life Sciences	20
Total Impact Factor	28.324

Faculty of Health & Life Sciences

S. No	Faculty Name	Papers Published in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Sahar Fazal	<p>1. R. M. Malik, S. Fazal, and M. A. Kamal, "Computational analysis of domains vulnerable to hpv-16 e6 oncoprotein and corresponding hot spot residues." Protein and Peptide Letters, vol. 27, 2020 IF=1.156, Category-Y</p> <p>2. R. Malik, S. Fazal and M.A. Kamal, "Computational Analysis of Dynamical Fluctuations of Oncoprotein E7 (HPV 16) for the Hot Spot Residue Identification Using Elastic Network Model," Letters in Drug Design & Discovery, Vol. 17, no. 11, pp.1393-1400, 2020 IF=1.169, Category-Y</p>	Nil	<p>1. In Silico Study of Propolis as a Potential Healing Agent for Gastric Ulcer</p> <p>2. Biochemical and Biological Evaluation of Propolis</p> <p>3. Insilico Analysis of Mosquito (Family: Culicidae) Microbiome Diversity and its Role in Insecticide Resistance</p> <p>4. Formal Modeling and Analysis of Insulin Resistance Pathway</p> <p>5. Isolation and Identification of Prevalent Microbial Pathogen From Domestic Kitchen Associated with Housefly</p>
2.	Dr. Shaukat Iqbal	<p>1. S. Hussain, Y.-J. Xie, D. Li, S. I. Malik, J. c. Hou, E. L. H. Leung, and X. X. Fan, "Current strategies against covid-19," Chinese medicine, vol. 15, no. 1, pp. 1-12, 2020 IF=2.960, Category-Y</p>	<p>1. Molecular Characterization and Computational Analysis of Drug-Resistant Strains of Mycobacterium Tuberculosis</p>	<p>1. Association Between IL-17A Polymorphisms (rs2275913 and rs3748067) and Cancer Risk in Asian Population: A Meta-Analysis</p>

		<p>2. M. T. Khan, A. C. Kaushik, Q. ul ain Rana, S. I. Malik, A. S. Khan, D.-Q. Wei, W. Sajjad, S. Ahmad, S. Ali, M. Irfan et al., “Characterization and synthetic biology of lipase from bacillus amyloliquefaciens strain,” Archives of Microbiology, vol. 202, pp. 1497–1506, 2020 IF=1.184, Category-X</p> <p>3. M. T. Khan, S. Ali, M. T. Zeb, A. C. Kaushik, S. I. Malik, and D.-Q. Wei, “Gibbs free energy calculation of mutation in pncA and rpsa associated with pyrazinamide resistance,” Frontiers in Molecular Biosciences, vol. 7, 2020 IF=4.188, Category-X</p> <p>4. A. Munir, S. I. Malik and K.A. Malik, “De-Novo Ligand Design against Mutated Huntington Gene by Ligand-based Pharmacophore Modeling Approach,” Current computer-aided drug design, Vol. 16, no. 2, pp.134-144, 2020 IF=0.935, Category-Y</p> <p>5. M. T. Khan, and S.I. Malik, “Structural dynamics behind</p>		<p>2. Meta-Analysis of Genetic Polymorphisms of Interleukin-1 Receptor Associated Kinase (IRAK1) with Susceptibility to Autoimmune Diseases</p> <p>3. Association of TNF-α - 308G/A Gene Polymorphism with the Risk of Autoimmune Diseases: A Meta-Analysis</p> <p>4. Comparison of The Biological Evaluation of Two Different Varieties of Cumin Seed Extract</p>
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		<p>variants in pyrazinamidase and pyrazinamide Resistance.” Journal of Biomolecular Structure and Dynamics, vol. 38, no 10, pp.3003-3017, 2020 IF=Nil, Category-X</p>		
<p>3. Dr. S. Marriam Bakhtiar</p>		<p>1. M. Nadeem, U. Naz, and S. M. Bakhtiar, “Tnf-α: Common culprit of inflammatory diseases,” International Journal Bioautomation, vol. 24, no. 1, pp. 41-50, 2020 IF=Nil, Category-Y</p> <p>2. N. I. Soomro, S. Iqbal, J. Iqbal, M. Imran, and S. M. Bakhtiar, “The potential impact of helicobacter pylori infection on the onset of metabolic disease,” Health Science Journal, vol. 14, no. 6, pp. 1–8, 2020 IF=Nil, Category-Nil</p> <p>3. H. A. Dar, T. Zaheer, N. Ullah, S. M. Bakhtiar, T. Zhang, M. Yasir, E. I. Azhar, and A. Ali, “Pangenome analysis of mycobacterium tuberculosis reveals core-drug targets and screening of promising lead compounds for drug discovery,”</p>	<p>Nil</p>	<p>1. Genome Based Drug Target Identification in Human Pathogen Streptococcus gallolyticus</p> <p>2. Identification of Therapeutic Targets Against Streptococcus gordonii by Subtractive Genomic Analysis</p> <p>3. Comparative Genomic Analysis to Explore Key Genetic Factors Associated with Probiotic Capabilities of Akkermansia muciniphila</p> <p>4. Analysis of Gut Microbiome Interactions in Autism Spectrum Disorder (ASD)</p>

4.	Dr. Erum Dilshad	<p>Antibiotics, vol. 9, no. 11, 2020 IF=Nil, Category-X</p> <p>4. A. Malik, A. Gul, R. Amir, F. Munir, M. M. Babar, S. M. Bakhtiar, M. Q. Hayat, R. Z. Paracha, Z. Khalid, and H. Alipour, "Classification and computational analysis of arabidopsis thaliana sperm cell-specific f-box protein gene 3p. atfbp113," <i>Frontiers in genetics</i>, vol. 11, 2020 IF=3.258, Category-W</p> <p>5. T. Zaheer, M. Waseem, W. Waqar, H. A. Dar, M. Shehroz, K. Naz, Z. Ishaq, T. Ahmad, N. Ullah, S. M. Bakhtiar et al., "Anti-covid-19 multi-epitope vaccine designs employing global viral genome sequences," <i>PeerJ</i>, vol. 8, 2020 IF=2.379, Category-W</p>	Nil	
4.	Dr. Erum Dilshad	<p>1. E. Dilshad, M. Bibi, N. A. Sheikh, K. F. Tamrin, Q. Mansoor, Q. Maqbool, and M. Nawaz, "Synthesis of functional silver nanoparticles and microparticles with modifiers and evaluation of their antimicrobial, anticancer, and</p>	Nil	<p>1. Pharmacological Evaluation of Zinc Oxide Nanoparticles Synthesized by using Leaf Extract of <i>Bryophyllum pinnatum</i>.</p> <p>2. Chromium Reduction and Plant Growth Promotion by</p>

		<p>antioxidant activity,” Journal of functional biomaterials, vol. 11, no. 4, 2020 IF=Nil, Category-X</p> <p>2. B. H. Kiani, W. K. Kayani, A. U. Khayam, E. Dilshad, H. Ismail, and B. Mirza, “Artemisinin and its derivatives: A promising cancer therapy,” Molecular Biology Reports, vol. 47, no. 8, pp. 6321–6336, 2020 IF=1.402, Category-W</p> <p>3. A. U. Khayam, H. Patel, N. A. Faiola, A. E. F. Milla, E. Dilshad, B. Mirza, Y. Huang, and M. S. Sheikh, “Quinovic acid purified from medicinal plant fagonia indica mediates anticancer effects via death receptor 5,” Molecular and cellular biochemistry, vol. 474, no. 1, pp. 159–169, 2020 IF=2.795, Category-X</p> <p>4. K. Khan, S. Safi, A. Abbas, Y. Badshah, E. Dilshad, M. Rafiq, K. Zahra, and M. Shabbir, “Unravelling structure, localization, and genetic crosstalk of klf3 in human breast</p>		<p>Staphylococcus arlettae in Wheat</p> <p>3. Synthesis and Evaluation of ZnO Nanoparticles of Trigonella foenum for their Biological Activities</p> <p>4. Green Synthesis, Characterization & Therapeutic Evaluation of ZnO Nanoparticles Prepared Using Extract of Nigella sativa Seeds</p> <p>5. Therapeutic Evaluation of Silver Nanoparticles Synthesized Using Bryophyllum pinnatum Plant Extract</p> <p>6. Biological Evaluation Of Seeds Of Trigonella foenum-graecum And Their Silver Nanoparticles</p>
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		<p>cancer,” <i>BioMed Research International</i>, vol. 2020, 2020 IF=2.276, Category-W</p> <p>5. H. Mehfooz, A. Saeed, M. Faisal, F. A. Larik, U. Muqadar, S. Khatoon, P. A. Channar, H. Ismail, S. Bilquees, S. Rashid, S. Shafique, B. Mirza, E. Dilshad and F. Ahmad, “Facile one-pot synthesis, butyrylcholinesterase and α-glucosidase inhibitory activities, structure-activity relationship, molecular docking and dna-drug binding analysis of mel drum’s acid derivatives,” <i>Research on Chemical Intermediates</i>, vol. 46, pp. 1–20, 2020 IF=2.262, Category-X</p> <p>6. S. Latif, H. Ismail, M. R. Khan, A. A. Rahim, R. Mehboob, E. Dilshad, M. Sajid, S. I. Haider, S. Anwaar, and M. N. Majeed, “Pharmacological evaluation of acacia modesta bark for antipyretic, anti-inflammatory, analgesic, antidepressant and anticoagulant activities in sprague dawley rats.” <i>Pakistan Journal of</i></p>		
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		<p>Pharmaceutical Sciences, vol. 33, no. 3, pp. 1015–1023, 2020 IF=0.562, Category-X</p> <p>7. E. Dilshad, H. Ismail, M. A. Khan, R. M. Cusido, and B. Mirza, “Metabolite profiling of artemisia carvifolia buch transgenic plants and estimation of their anticancer and antidiabetic potential,” Biocatalysis and Agricultural Biotechnology, vol. 24, 2020 IF=Nil, Category-X</p>		
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5.	Dr. Arshia Amin Butt	<p>1. A. Amin, I. Ahmed, N. Khalid, I. U. Khan, A. Ali, S. M. Dahlawi, and W.-J. Li, "Insights on comparative bacterial diversity between different arid zones of cholistan desert, pakistan," 3 Biotech, vol. 10, no. 5, 2020 IF=1.798, Category-Nil</p>	Nil	<p>1. Resistome Distribution Vs Total Bacterial Diversity in Five Major Glaciers of Pakistan</p> <p>2. Enumeration of Pathogenic Bacteria From Chicken Slaughter Containers in Twin Cities; A Source of Antibiotic Resistance</p> <p>3. Prevalence of Potential Pathogens Present in Biomedical Waste and Analysis of Efficacy of Routinely Used Disinfectants</p> <p>4. New Players in the Sulfur Cycle the Microbial Ecology of Anaerobic and Archaeal Sulfur Reduction; A Step Towards Efficient Microbial Enhanced Oil Recovery</p> <p>5. Metagenomic Analysis of Ammonia Oxidizing Archaea Affiliated with the Oil Field</p>
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Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

Capital University of Science and Technology (CUST) Research Report (2020)-Faculty of Management & Social Sciences

S. No	Faculty Name	Papers Published in 2020	Impact Factor in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Arshad Hassan	06	5.167	04	06
2.	Dr. Mueen Aizaz Zafar	-	-	01	02
3.	Dr. Muhammad Mazhar Iqbal	-	-	02	02
4.	Dr. Ansir Ali Rajput	-	-	-	01
5.	Dr. Sayyed Mehdi Raza Naqvi	01	-	01	11
6.	Dr. Arif Vaseer	-	-	-	01
7.	Dr. Jaleel Ahmed	04	1.154	-	09
8.	Dr. Ishfaq Khan	02	-	01	02
9.	Dr. Saira Ahmed	-	-	-	03
10.	Dr. Lakhi Muhammad	03	9.886	-	06
11.	Dr. Ahsan Mahmood	-	-	-	01
12.	Dr. Nousheen Tariq Bhutta	-	-	-	04

13.	Dr. Sabahat Haqqani	-	-	-	-
14.	Dr. Shazia Faiz	01	-	-	03
15.	Dr. Samiya Safdar	02	-	-	02
16.	Dr. Ishrat Yousaf	-	-	-	-
17.	Namra Mubarak	01	1.989	-	-
18.	Maryam Khan	04	0.972	-	-
19.	Sarah Nawaz Malik	-	-	-	05

Total Number of Research Papers by Faculty of Management & Social Sciences	23
Total Impact Factor	19.168

Faculty of Management Sciences & Social Sciences

S. No	Faculty Name	Papers Published in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Arshad Hassan	<p>1. M. H. Khan, A. Fraz, A. Hassan, and P. Abedifar, "Female board representation, risk-taking and performance: Evidence from dual banking systems," Finance Research Letters, vol. 37, 2020 IF=3.527, Category-W</p> <p>2. H. Raza, A. Hassan, and A. Rashid, "The impact of downside risk on expected return: Evidence from emerging economies," The Lahore Journal of Business, vol. 8, no. 1, pp. 91–106, 2020 IF=Nil, Category-Nil</p> <p>3. S. Ijaz, A. Hassan, A. Tarazi, and A. Fraz, "Linking bank competition, financial stability, and economic growth," Journal of Business Economics and Management, vol. 21, no. 1, pp. 200–221, 2020 IF=1.640, Category-W</p> <p>4. H. Raza, A. Hassan, and F. Gul, "Does Pakistan stock exchange</p>	<p>1. Mean and volatility Spill Over Between the Stock, Gold and Oil Markets During US Financial Crisis and Chinese Stock market Crash</p> <p>2. Multilevel Drivers of Bank Risk Taking in Dual banking Systems: Evidence From OIC Countries</p> <p>3. Impact of National Culture on Financial Decisions of the Firms: Evidence from Worldwide Non-Financial Companies</p> <p>4. Liquidity Risks and Asset Pricing in Asian Stock Markets</p>	<p>1. Sukuk and International Financial Markets: Co-movement Dynamics</p> <p>2. Seasonality, Asymmetry and Non-linearity in Return and Conditional Volatility of Leading Cryptocurrencies</p> <p>3. Impact of Crude Oil Market on the South Asian Equity Markets: Copula Approach</p> <p>4. Spillover from Global Volatility Index to Equity Markets of Selected Islamic Countries</p> <p>5. Long Term Comovement among Cryptocurrencies: an Application of Cointegration Analysis</p> <p>6. Evaluation of Value-at-Risk and Conditional Value-at-Risk by using GARCH Model in Pakistan Equity Market</p>

2.	Dr. Mueen Aizaz Zafar	<p>pay to bet against the beta.?" City University Research Journal, vol. 10, no. 1, pp. 167-176, 2020 IF=Nil, Category-Y</p> <p>5. M. Mansoor, N. Ellahi, A. Hassan, Q. A. Malik, A. Waheed and N. Ullah, "Corporate Governance, Shariah Governance, and Credit Rating: A Cross-Country Analysis from Asian Islamic Banks," Journal of Open Innovation: Technology, Market, and Complexity, vol. 6. No.4, 2020 IF=Nil, Category-W</p> <p>6. A. Fraz, A. Hassan and S. Chughtai, "Does Economic Integration Affect the Co-movement between Financial Markets? Evidence from Pakistani equity market with its global partners," Journal of Applied Economics and Business Studies, vol. 4, no. 3, pp.137-158, 2020 IF=Nil, Category-Y</p>	<p>1. Corporate Responsibility and Customer Responses: Analyzing the Role of Cause Related Marketing, Social and Customer</p>	<p>1. Impact of Perceived Ease of Use and Perceived Usefulness of Enterprise Resource Planning System</p>
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			Brand Trust and Brand Attachment	Adoption on End User Acceptance
3.	Dr. Muhammad Mazhar Iqbal	Nil	<ol style="list-style-type: none"> 1. Intellectual Capital, Firm's Performance and Market Value: An Empirical Study of South Asian Emerging Economies 2. Corporate Governance and Accounting Conservatism: Empirical Evidence from Emerging Markets of South Asia 	<ol style="list-style-type: none"> 2. Impact of Virtual Collaboration on Project Success with the Mediating Role of Task Complexity and Moderating Role of Trust
4.	Dr. Ansir Ali Rajput	Nil	Nil	<ol style="list-style-type: none"> 1. Performance Comparisons of Islamic and Conventional Banks in Bangladesh, Malaysia and Pakistan 2. Determinants of FDI: Evidence from Asian Countries
5.	Dr. Sayyed Mehdi Raza Naqvi	<ol style="list-style-type: none"> 1. Q. Hayat, S. M. M. R. Naqvi et al., "Antecedents and consequences of employee's greed: An empirical examination (evidence from Pakistan)," Global Regional Review, vol. 4, no. 3, pp. 73-81, 2020 	<ol style="list-style-type: none"> 1. Impact of Employee Development on Organizational Behavior and Employee Turnover Intensions 	<ol style="list-style-type: none"> 1. Impact of Entrepreneurial Orientation on Project Success: Mediating Role of Technological Orientation and Moderating Role of Top Management Support 1. The Relation between Despotic Leadership and Psychological Well-Being in Project Based Organization 2. Impact of Despotic Leadership (DL) on Employee's Performance:

		<p>IF=Nil, Category-Y</p>		<p>Mediating Effect of Emotional Exhaustion (EE) and Role of Project Culture as Moderator</p> <p>3. Impact of Servant Leadership on Employee Performance with Mediating Role of Trust in Leadership and Moderating Role of Power Distance</p> <p>4. Impact of Workplace Fun On Project Task Performance with The Mediating Role of Employee Engagement and Moderating Role of Positive Humor</p> <p>5. Impact of Despotic Leadership on Employee Instigated Workplace Incivility through Interpersonal Conflict with Moderation of Self-Efficacy</p> <p>6. Impact of Workplace Bullying on Employee Cynicism by Considering Emotional Labour as a Mediator and Core Self-Evaluation as a Moderator</p>
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				Emotional Labor and Moderating Role of Power Distance
6.	Dr. Arif Vaseer	Nil	Nil	1. Impact of Project Risk Management on Project Quality with the Mediating Role of Project Efficiency and Moderating Role of Project Culture
7.	Dr. Jaleel Ahmed	<p>1. J. Ahmed and U. Farooq, "Financial development and trade credit: Moderating role of corruption," City University Research Journal, vol. 10, no. 3, 2020 IF=Nil, Category-Y</p> <p>2. R. Anwar and J. Ahmed, "When does corporate social responsibility disclosure affect investment efficiency? a new answer to an old question," SAGE Open, vol. 10, no. 2, 2020 IF=0.715, Category-W</p> <p>3. R. Anwar and J. Ahmed, "Evaluating the moderating impact of family on the relationship between board independence and corporate social responsibility using propensity score matching," South African Journal of</p>	Nil	<p>1. Product Diversification and Bank Risk Evidence from South Asian Banking Institutions</p> <p>2. Determinants of Capital Structure and Influence of 2008 Financial Crisis: Evidence from Pakistani Non-Financial Firms</p> <p>3. Impact of Bank Specific Variables on Banks Profitability: Moderating Role of Global Financial Crisis</p> <p>4. Impact of Independent Directors and Board Size on Corporate Investment Policy</p> <p>5. The Impact of People-related Quality Management Practices on Project</p>

8.	Dr. Ishfaq Khan	<p>Business Management, vol. 51, no. 1, 2020 IF=0.439, Category-Y</p> <p>4. U. Farooq, J. Ahmed, K. Ashfaq, G. U. H Khan and S. Khan “National culture and firm financial performance: A mediating role of firm financing decision,”. Cogent Business & Management. Vol. 07, no. 1, 2020 IF=Nil, Category-X</p>		<p>Performance with Moderating Role of Communication</p> <p>6. Development of App to Provide Blue Collar Services to the Public</p> <p>7. Impact of Monetary Policy on Islamic and Conventional Bank Financing: Evidence from Pakistani Banking Sector</p> <p>8. Impact of Shared Leadership on Project Success with Mediating Role of Team Building and Moderating Role of Project Complexity</p> <p>9. Impact of Macroeconomic Variables on Stock Markets: An Evidence from Emerging and Developed Markets</p>
		<p>1. U. F. Gillani, M. I. Khan, M. W. Ishaq, K. Aziz, and M. N. Akram, “The factors of why the people of Pakistan do not purchase paid apps,” International Journal of Online Marketing (IJOM), vol. 10, no. 2, pp. 44–56, 2020 IF=Nil, Category-Y</p>	<p>1. Antecedents and Outcomes of Perceived Brand Authenticity: A Study of Sustainable Brands</p>	<p>1. Impact of Feminine Leadership on Project Success: Mediating Role of Project Manager’s Passion and Moderating Role of Project Manager’s Emotional Intelligence</p>

9.	Dr. Saira Ahmed	<p>2. S. Iqbal, and M. I. Khan, “Spirituality as a Predictor of Psychological Well-Being: An Explanatory Mechanism of Religiosity and Sustainable Consumption,” . Religions, vol. 11, no 12, 2020 IF=Nil, Category-W</p> <p>3. J. Khurshid, N. Khurshid, and M. I. Khan “Impact of Social Identity on Women Entrepreneurial Intention/Behavior: Mediating Role of Attitude Towards Behavior and Moderating Role of Personal Network” Hamdard Medicus, vol. 43, no. 1, pp. 449-465, 2020 IF=Nil, Category-Y</p>	Nil	2. Impact of Knowledge Management Capabilities on Project Success: Mediating Role of Team Cohesion and Moderating Role of Emotional Intelligence
	Nil	Nil	Nil	<p>1. Impact of Nepotism on Project Failure: Mediating Role of Employee Turnover and Moderating Role of Job Insecurity Climate</p> <p>2. Impact of Shared Leadership on Virtual Team Effectiveness in Project with the Mediating Role of Trust Building and Moderating Role of Project Culture</p>

10.	Dr. Lakhi Muhammad	<p>1. S. Aziz, Z. Afaq, L. Muhammad, and B. Khan, "The role of media, word of mouth, and subjective norms in determining attitude and intentions to purchase family takaful schemes," <i>Journal of Islamic Business and Management</i>, vol. 10, no. 1, pp. 111–131, 2020 IF=Nil, Category-Y</p> <p>2. L. Muhammad et al., "Mediating role of customer forgiveness between perceived justice and satisfaction," <i>Journal of Retailing and Consumer Services</i>, vol. 52, 2020 IF=4.219, Category-W</p> <p>3. A. Sarwar and L. Muhammad "Impact of employee perceptions of mistreatment on organizational performance in</p>	Nil	<p>3. Investigating the Impact of Project Managers Passion during COVID-19 on Projects' Success via Mediation of Professionalism and Moderation of Computer Self-efficacy</p> <p>1. An Integrated Model for Cues Motivating Online Tour Destination Purchase Decision</p> <p>2. Impact of Emotional Intelligence on Project Performance by Considering Mediating Role of Task Interdependence and Moderating Role of Risk Management</p> <p>3. Impact of Functional, Symbolic and Hedonic Values on Brand Trust to Shape Brand Attachment by Considering Brand Trust as Mediator in Hospitality Industry</p> <p>4. Impact of Despotic Leadership on Employee Job Performance and Life</p>
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		the hotel industry,” International Journal of Contemporary Hospitality Management, vol. 32, no.1, 2020 IF=5.667, Category-W		Satisfaction with a Mediating Role of Emotional Exhaustion and Moderating Role of Social Support 5. Impact of Openness to Experience on Innovative Behavior In Projects with Mediating Role of Epistemic Curiosity and Moderation Role of Project Culture 6. Impact of Knowledge Diversity in Projects on Team Creativity and Project Survival: Examining the Mediating Nature of Team Creativity and Moderating Role of Relational Social Capital
11.	Dr. Ahsan Mahmood	Nil	Nil	1. Attitude Formation Barriers towards Digital Advertising Resistance, with the Moderating Effect of Traditional Advertising
12.	Dr. Nousheen Tariq Bhutta	Nil	Nil	1. Return and Volatility Spillover from Global Interest Rate to Equity Market of South Asian Countries 2. Mean and Volatility Spillovers of Crude Oil on

				Food Sector Stock Indices in Oil Importing and Oil Exporting Countries
				3. Co-Movement & Time Varying Correlations Between Oil Prices, Gold Prices And Islamic Equity Indices
				4. Impact Of Return & Volatility Spillover From Financial Inclusion To Banking Industry & To Other Industries: An Evidence From Pakistan
13.	Dr. Sabahat Haqqani	Nil	Nil	Nil
14.	Dr. Shazia Faiz	1. S. Safdar, M. H. Saghir, S. Faiz, M. R. Yasmin, M. N. Mubarak et al., "Trust in leaders and job satisfaction of health care workers: Linking organizational justice to citizenship behavior," The Journal of Social Sciences Research, vol. 6, no. 8, pp. 737-744, 2020 IF=Nil, Category-Nil	Nil	1. Impact of Cronyism on Deviant Workplace Behavior and Employee Creativity: Mediating Role of Moral Disengagement and Moderating Role of Power Distance 2. Impact of Talent Management Practices on Project Success: The Mediating Role of Proactive Behavior: and Moderating Role of Ethical Leadership

				3. Impact of Proactive Personality on Project Performance: The Mediating Role of Thriving at Work and Moderating Role of Collectivism
15.	Dr. Samiya Safdar	<p>1. S. Safdar, M. H. Saghir, S. Faiz, M. R. Yasmin, M. N. Mubarak et al., "Trust in leaders and job satisfaction of health care workers: Linking organizational justice to citizenship behavior," The Journal of Social Sciences Research, vol. 6, no. 8, pp. 737–744, 2020 IF=Nil, Category-Nil</p> <p>2. S. Safdar and S. Liu, "The influence of justice on commitment of pakistani bankers: job satisfaction as mediator," International Journal of Public Administration, vol. 43, no. 14, pp. 1183–1193, 2020 IF=Nil, Category-X</p>	Nil	<p>1. Impact of Abusive Leadership on Project Success with Mediating Role of Workplace Deviance and Moderating Role of Agreeableness</p> <p>2. Impact of Passive Leadership on Emotional Exhaustion with the Mediating Role of Workplace Incivility and Moderating Role of Affective Commitment</p>
16.	Dr. Ishrat Yousaf	Nil	Nil	Nil
17.	Namra Mubarak	1. J. Khan, M. Jaafar, B. Javed, N. Mubarak and T. Saudagar," Does inclusive leadership affect project success? The mediating role of perceived psychological empowerment and	Nil	Nil

		<p>psychological safety” of International Journal of Managing Projects in Business, vol. 13, no. 5, 2020 IF=1.989, Category-W</p>		
18.	Maryam Khan	<p>1. M. Khan and A. Kamal, “Confirmatory Factor Analysis of Implicit Beliefs Measure and the Role of Demographics among Pakistani Sample” The Spanish Journal of Psychology, vol. 23, 2020 IF=0.972, Category-W</p> <p>2. M. Khan, and N. Aslam, “Perception of God’s Attributes for Mental Comfort in Stressful Life Events” Foundation of University Journal of Psychology, vol. 4, no. 2, pp. 37-45, 2020 IF=Nil, Category-Y</p> <p>3. M. Khan, and S. Zeb, “An Adaptive Approach towards COVID-19: Managing Psycho-social Crisis,” Foundation of University Journal of Psychology, vol. 4, no. 2, pp. 11-15, 2020 IF=Nil, Category-Y</p>	Nil	Nil

19.	Sara Nawaz Malik	4. M. Khan, and N. Aslam “Prevalence of Caffeine Intake among Cigarette Smokers: Directing Caffeine Use Disorder among Pakistani Population” Pakistan Journal of Medical Research, vol. 59, no. 1, pp. 15-21, 2020 IF=Nil, Category-Y		
		Nil	Nil	<p>1. Impact of Total Quality Management on Organizational Performance with Mediating Role of Organizational Culture and Moderating Role of Project Complexity.</p> <p>2. The Role of Shared Leadership on Team Effectiveness in Project Teams, with Mediating Role of Trust and Moderated by Project Team Commitment.</p> <p>3. The Role of Emotional Intelligence in Agile Team Composition as Mediator in Software Project Success with Transformational Leadership as Moderator.</p>

				<p>4. The Impact of LMX Quality on Project Success: The Mediating Role of Subordinates' Trust and Moderating Role of Power Distance.</p> <p>5. Impact of Gossip at Workplace on Workplace Incivility; Mediating Role of Interpersonal Conflict and Moderating Role of Personality</p>
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Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

Capital University of Science and Technology (CUST) Research Report (2020) - Faculty of Pharmacy

S. No	Faculty Name	Papers Published in 2020	Impact Factor in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Muzaffar Abbas	06	21.517	-	-
2.	Dr. Samra Bashir	03	1.813	-	-
3.	Dr. Mahboob Alam	03	5.924	-	-
4.	Dr. Nadia Shamshad Malik	05	7.175	-	-
5.	M. Majid	01	2.879	-	-
6.	Tariq Khan	01	4.082	-	-

Total Number of Research Papers by Faculty of Pharmacy	19
Total Impact Factor	43.39

Faculty of Pharmacy

S. No	Faculty Name	Papers Published in 2020	PhD Completed in 2020	MS Completed in 2020
1.	Dr. Muzaffar Abbas	<p>1. M. T. Khan, H. Nadeem, A. u. Khan, M. Abbas, M. Arif, N. S. Malik, Z. Malik, and I. Javed, "Amino acid conjugates of 2-mercaptobenzimidazole provide better anti-inflammatory pharmacology and improved toxicity profile," Drug Development Research, vol. 81, no. 8, pp. 1057–1072, 2020 IF=1.902, Category-X</p> <p>2. N. U. Rehman, M. Abbas, M. Al-Rashida, A. Tokhi, M. A. Arshid, M. S. Khan, I. Ahmad, and K. Rauf, "Effect of 4-fluoro-n-(4-sulfamoylbenzyl) benzene sulfonamide on acquisition and expression of nicotine-induced behavioral sensitization and striatal adenosine levels," Drug Design, Development and Therapy, vol. 14, p. 3777-3786, 2020 IF=3.216, Category-W</p> <p>3. N. U. Rehman, M. Al-Rashida, A. Tokhi, Z. Ahmed, F. Subhan,</p>	Nil	Nil

		<p>M. Abbas, M. A. Arshid, and K. Rauf, "Analgesic and antiallodymic effects of 4-fluoro-n-(4-sulfamoylbenzyl) benzene sulfonamide in a murine model of pain," Drug Design, Development and Therapy, vol. 14, p. 4511-4518, 2020 IF=3.216, Category-W</p> <p>4. N. U. Rehman, K. Esmailpour, S. Joushi, M. Abbas, M. al Rashida, K. Rauf, and Y. Masoumi-Ardakani, "Effect of 4-fluoro-n-(4-sulfamoylbenzyl) benzene sulfonamide on cognitive deficits and hippocampal plasticity during nicotine withdrawal in rats," Biomedicine & Pharmacotherapy, vol. 131, p. 110783, 2020 IF=4.545, Category-W</p> <p>5. M. Sona Khan, W. Trenet, N. Xing, B. Sibley, M. Abbas, M. al Rashida, K. Rauf, and C. D. Mandyam, "A novel sulfonamide, 4-fs, reduces ethanol drinking and physical withdrawal associated with ethanol dependence," International Journal of</p>		
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		<p>Molecular Sciences, vol. 21, no. 12, p. 4411, 2020 IF=4.556, Category-W</p> <p>6. M. Imran, L. T. Al Kury, H. Nadeem, F. A. Shah, M. Abbas, S. Naz, A.-u. Khan, and S. Li, “Benzimidazole containing acetamide derivatives attenuate neuroinflammation and oxidative stress in ethanol-induced neurodegeneration,” <i>Biomolecules</i>, vol. 10, no. 1, 2020 IF=4.082, Category-X</p>		
<p>2.</p>	<p>Dr. Samra Bashir</p>	<p>1. S. Bashir, A. u. Khan, M. Mahmood, M. Abbas, S. Akhtar, A. W. Khan, M. T. Aqeel, M. Akhlaq, and H. Ahmad, “Students’ perception of the learning environment in private-sector pharmacy institutes of pakistan,” <i>Pharmacy Education</i>, vol. 20, pp. 191–197, 2020 IF=Nil, Category-X</p> <p>2. A. H. Palla, A. u. H. Gilani, S. Bashir, and N. Ur Rehman, “Multiple mechanisms of flaxseed: Effectiveness in inflammatory bowel disease,” <i>Evidence-Based complementary</i></p>	<p>Nil</p>	<p>Nil</p>

		<p>and Alternative Medicine, vol. 2020, pp. 1–16, 2020 IF=1.813, Category-W</p> <p>3. F. Khurshid, S. Bashir, and B. Noushad, “Prescription writing through the lens of the threshold concept framework: a narrative review,” Res Dev, vol. 9, no. 1, 2020 IF=Nil, Category-Nil</p>		
<p>3.</p>	<p>Dr. Mahboob Alam</p>	<p>1. U. Ullah, H. Badshah, Z. Malik, Z. Uddin, M. Alam, S. Sarwar, A. Aman, A. u. Khan, and F. A. Shah, “Hepatoprotective effects of melatonin and celecoxib against ethanolinduced hepatotoxicity in rats,” Immunopharmacology and Immunotoxicology vol. 42, no, 3, ,2020 IF=2.352, Category-X</p> <p>2. Khan, Z. Iqbal, S. Nazir, M. Alam, and A. Naz, “Evaluation of emesis control with orally disintegrating tablets and conventional tablets of domperidone: a randomized trial,” Latin American Journal OF Pharmacy, vol. 39, no. 1, pp. 29–37, 2020</p>	<p>Nil</p>	<p>Nil</p>

		<p>IF=0.240, Category-Y</p> <p>3. M. Faheem, S. H. Ali, A. W. Khan, M. Alam, U. Ilyas, M. Zahoor, M. U. K. Sahibzada, S. Khalid, R. Ullah, A. S. Alqahtani, A. M. Alqahtani. “1,3,4-Oxadiazole Derivative Attenuates Chronic Constriction Injury Induced Neuropathic Pain: A Computational, Behavioral, and Molecular Approach”. Brain Sciences, vol. 10, no. 10, 2020.</p> <p>IF= 3.332, Category= Y</p>		
4.	Dr. Nadia Shamshad Malik	<p>1. Y. Mehmood, U. Farooq, H. Yousaf, H. Riaz, R. K. Mahmood, A. Nawaz, Z. Abid, M. Gondal, N. S. Malik, K. Barkat et al., “Antiviral activity of green silver nanoparticles produced using aqueous buds extract of syzygium aromaticum,” Pakistan Journal of Pharmaceutical Science, vol. 33, no. 2, pp. 839–845, 2020</p> <p>IF=0.562, Category-X</p> <p>2. N. S. Malik, M. Ahmad, M. U. Minhas, R. Tulain, I. Khalid, K. Barkat, and A. Rashid, “Toxicological evaluation of xanthan gum based hydrogel</p>	Nil	Nil

		<p>formulation in wistar rats using single dose study,” Acta Polonicae Pharmaceutica, vol. 77, no. 2, pp. 353–360, 2020 IF=0.456, Category-Y</p> <p>3. N. S. Malik, M. Ahmad, M. U. Minhas, R. Tulain, K. Barkat, I. Khalid, and Q. Khalid, “Chitosan/xanthan gum based hydrogels as potential carrier for an antiviral drug: Fabrication, characterization, and safety evaluation,” Frontiers in Chemistry, vol. 8, p. 50, 2020 IF=3.693, Category-W</p> <p>4. N. A. Salam, M. A. Naeem, N. S. Malik, M. Riaz, F. Aslam et al., “Exploring the potential of tianeptine matrix tablets: Synthesis, physico-chemical characterization and acute toxicity studies.” Pakistan Journal of Pharmaceutical Sciences, vol. 33, no. 1 (Supplementary), pp. 269–279, 2020 IF=0.562, Category-X</p> <p>5. M. T. Khan, H. Nadeem, A. u. Khan, M. Abbas, M. Arif, N. S. Malik, Z. Malik, and I. Javed,</p>	
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		<p>“Amino acid conjugates of 2-mercaptobenzimidazole provide better anti-inflammatory pharmacology and improved toxicity profile.” Drug Development Research, vol. 81, no. 8, pp. 1057–1072, 2020 IF=1.902, Category-X</p>		
5.	M. Majid	<p>1. M.W. Baig, B. Nasir, D. Waseem, M. Majid, M.Z.I Khan, I. Haq, “Withametin: a biologically active withanolide in cancer, inflammation, pain and depression”, Saudi Pharmaceutical Journal, vol. 28, Issue 12, pp.1526-1537, 2020. IF=2.879, Category-W</p>	Nil	Nil
6.	Tariq Khan	<p>1. A. M. Alvi, L. T. A. Kury, M. U. Ijaz, F. A. Shah, M. T. Khan, A. S. Sheikh, H. Nadeem, A. Khan, A. Zeb, S. Li, “Post-treatment of synthetic polyphenolic 1,3,4-oxadiazole compound A3, attenuated ischemic stroke-induced neuroinflammation and neurodegeneration.” Biomolecules, vol. 10, no. 1, pp. 816, 2020. IF=4.082, Category-W</p>	Nil	Nil



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

No.23/CUST/ORIC/2020

October 27, 2020

One-Day Workshop on Latex

Office of Research, Innovation and Commercialization (ORIC) organized One-Day Workshop on Latex on Wednesday, 21st October 2020 in Instructions Lab-III. The purpose of the workshop was to equip students and faculty members with the contemporary knowledge about creation of technical documents using Latex with practical illustrations.

Latex is a Typesetting system suitable for producing scientific and mathematical documents which enable authors to typeset and print their work at the highest typographical quality. It is most often used for medium-to-large technical or scientific documents and can be used for almost any form of publishing. The workshop covered following topics in brief:

1. Latex Overview and Installation
2. Document Write-up
3. Mathematics Operations
4. Insertion of Figures and Tables
5. Generation of Table of Contents
6. Bibliography



The workshop was conducted by Mr. Umair Rafique Research Associate, EE Department, CUST. The session ended on a high note and proved to be a great source of knowledge to the participants. The Resource Person and participants were graciously thanked by Assistant Director ORIC with commitment to continue such type of trainings on continual basis.

Prepared by:

Muhammad Raheel Anjum
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

No.23/CUST/ORIC/2020

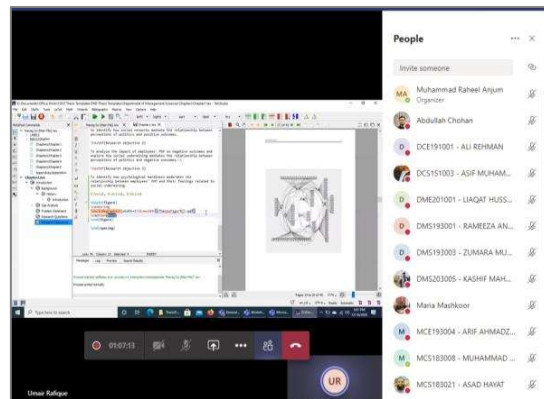
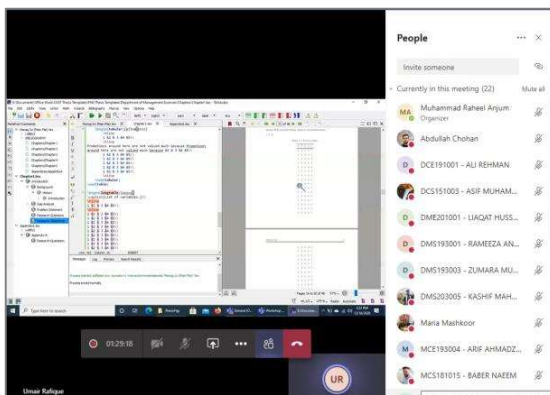
January 04, 2020

One-Day Workshop on Latex

Office of Research, Innovation and Commercialization (ORIC) organized One-Day Workshop on Latex on Wednesday, 16th December 2020. The session was held on “ORIC Seminars” Team. The purpose of the workshop was to equip participants with the most updated knowledge about creation of technical documents using Latex with practical illustrations.

Latex is a Typesetting system suitable for producing scientific and mathematical documents which enable authors to typeset and print their work at the highest typographical quality. It is most often used for medium-to-large technical or scientific documents and can be used for almost any form of publishing. The workshop covered following topics in brief:

1. Latex Overview and Installation
2. Document Write-up
3. Mathematics Operations
4. Insertion of Figures and Tables
5. Generation of Table of Contents
6. Bibliography



The workshop was conducted by Mr. Umair Rafique Research Associate, EE Department, CUST. A total of 22 participants including the faculty members, research scholars and students from various departments attended the workshop. The event lasted till 4:30 PM including the Q/A session. The Resource Person and participants were graciously thanked by Assistant Director ORIC with commitment to continue such type of workshops in future.

Prepared by:

Muhammad Raheel Anjum
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

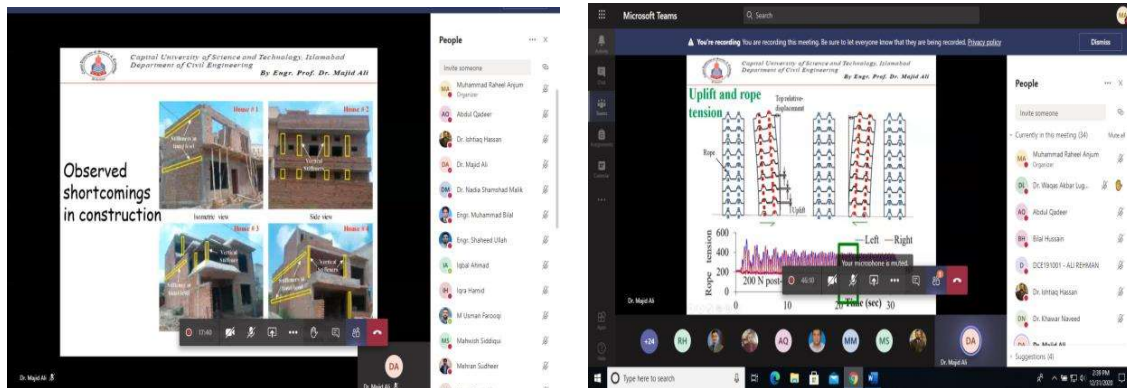
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No.23/CUST/ORIC/2020

January 04, 2020

Professorial Inaugural Lecture of Engr. Dr. Majid Ali, Professor, CE Department, CUST

Office of Research, Innovation and Commercialization organized the Professorial Inaugural Lecture to honor Engr. Dr. Majid Ali, Professor, CE Department and Convener, University Health, Safety and Security Committee on Thursday December 31, 2020 at 02:00 PM. The session was held online on “ORIC Seminars” Team. The lecture was delivered on the topic entitled “Do We Live in Safe Housing? (From earthquakes point of view)”. An Inaugural lecture is an occasion of significance in a faculty member's career. Professors are usually required to give their inaugural lecture within 12 months of their appointment.



The session started with a brief introduction of Prof. Majid Ali regarding his extraordinary academic and research achievements presented by Assistant Director ORIC. After welcome note and acknowledgement, the guest speaker was invited for the talk. The talk enclosed the conventional building techniques, and current practices followed on worldwide for safe and earthquake resistant housing. The speaker discussed the subject in an extremely interactive and simpler way, understandable by participants across various academic backgrounds.

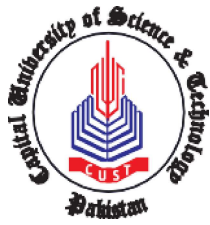
The event lasted till 03 PM including Q/A session. The response of faculty members was quite promising. A total of 34 faculty members and research scholars from various departments attended the event. The Resource Person and participants were graciously thanked by Assistant Director ORIC at the end of the session.

Prepared by:

Muhammad Raheel Anjum
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY



FINAL YEAR PROJECTS FUNDING

Applications are invited by the Office of Research, Innovation and Commercialization (ORIC), CUST for the funding of selective Final Year Projects (FYPs) having a specific Business and Commercialization Prospect. A total of six Undergraduate Projects would be sponsored by an amount of 30,000 PKR each.

Evaluation Criteria:

- ✚ Innovative Idea
- ✚ Practical Possibility
- ✚ Specific Business Plan
- ✚ Marketing Potential
- ✚ Sales Tendency
- ✚ Commercialization Aptitude

**Applications
Deadline:
01st Dec 2020**

Application forms are available at:

ORIC Office, H-Block, Ground Floor 📞 051-111-555-666 Ext: 445
or can be Downloaded from CUST Website: <https://cust.edu.pk/downloads>
Submit the Filled Application Forms in ORIC Office before 01st Dec 2020



Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

Email: info@cust.edu.pk, Website: <http://www.cust.edu.pk>

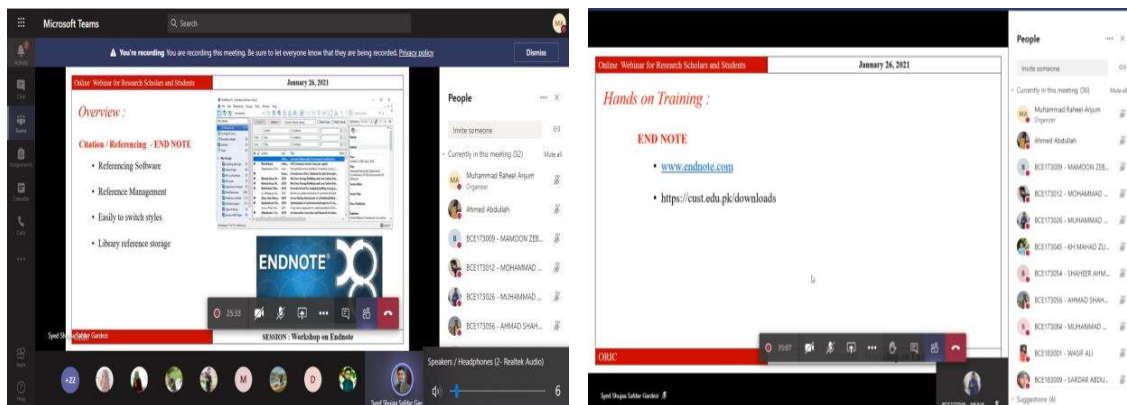
No.23/CUST/ORIC/2021

February 04, 2021

One-Day Workshop on Endnote

Office of Research, Innovation and Commercialization (ORIC) organized One-Day Workshop on Endnote on Tuesday, 26th January 2021. The session was held on “ORIC Seminars” Team. The purpose of the workshop was to educate participants with the most updated knowledge about Endnote and its use in the process of research papers and thesis write-up.

EndNote is a multiplatform software tool that helps you manage the process of writing and preparing research papers and thesis, and transfer and store references from electronic databases and library catalogues. It can easily be used to change styles, format a bibliography view and synchronize your library and work across devices. The workshop covered some of the basic topics related to EndNote like Citation Components and Referencing Styles, Reference Management, Library Reference Storage etc. The workshop contents were augmented with practical demonstration on software.



The session was conducted by Dr. Syed Shuja Safdar Gardezi, Assistant Professor CE Department and Director BIM Center of Excellence, CUST. A total of 35 participants including the faculty members, research scholars and students from various departments attended the workshop. The session ended on a high note and proved to be a great source of knowledge to participants.

Prepared by:

Muhammad Raheel Anjum
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation



Capital University of Science & Technology

Islamabad Expressway, Kahuta Road Zone-V, Islamabad

Phone: +92-51-111555666, Fax 92-51-44867065

Email:info@cust.edu.pk, Website:http/www.cust.edu.pk

No.37/CUST/ORIC/2021

Dated: January 05, 2021

2nd Joint Meeting Between ORIC and OCL

Minutes of the meeting held on January 01, 2021

Second joint meeting between Office of Research, Innovation & Commercialization (ORIC) and Office of Corporate Linkages (OCL) was held on 1st January, 2021 at Office of Corporate Linkages, Block-D at 1:30 PM. Dr. Aamer Iqbal Bhatti, Dean Research & Innovation chaired the meeting.

The following attended the meeting.

Dr. Arif Vaseer	Director, OCL
Mr. Muhammad Farhan	Assistant Director ORIC

The purpose of meeting was to have a joint industrial collaboration effort by ORIC and OCL . Moreover, this meeting aimed to jointly initiate endeavor to uplift the repute of CUST. Salient features of the meeting are as follows:

Item 01 Pharmaceutical Industry Liaison

Action By

- 1.1 Dean Research & Innovation briefed Director OCL about the effort ORIC has put in identifying the Industries which are in near vicinity of CUST. He said that in the three industrial zones surrounding CUST that are Rawat, Hattar and Humak industrial zones, the major manufacturers are Iron & Steel, Floor Mills and Pharmaceutical Industries. He further added that ORIC identified that more than 15 pharmaceutical industries are situated within 5 Km radius of CUST. Therefore, ORIC would like to first engage with these pharmaceutical industries and for this Dean Research & Innovation requested Director OCL to have a joint effort to collaborate.

A/D ORIC

- 1.2 Director, OCL and Dean Research & Innovation agreed to start combine efforts in wining confidence of these industries. Assistant Director ORIC was tasked to identify and establish contact with the local pharmaceutical Association. It was agreed that to have an effective collaboration, the pharmaceutical industries will be contacted through the Pharmaceutical Association.

Item 02 Liaison with Strategic and Corporate Organization

- 2.1 Dean Research & Innovation said that ORIC has gathered and drafted list of targeted Industries. Dean Research & Innovation asked opinion of Director OCL that how to reach and collaborate with these industries.

- 2.2 After deliberate discussion it was agreed that a letter introducing CUST and appreciating these organization will be drafted and approved from VC. The letter will be forwarded to these industries with invitation to have a joint meeting for collaboration. ORIC and OCL
- 2.3 It was also agreed that collaboration with the industries will be helpful in term of :
- (a) Providing Internships to CUST Students
 - (b) Research Collaboration for CUST PhD Students and Faculty
 - (c) CUST Students Employment

Being no further item for discussion the meeting was adjourned with a vote of thanks to the chair and participants.

Prepared by



Muhammad Farhan
Assistant Director ORIC

Approved by:



Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Distribution.

- VC Office
- OCL
- File

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Optimization and Establishment of In Vitro Cultures of Potato, Banana and Ornamental Plants for Commercialization

1. Preamble

In recent years, tissue culture techniques have become very famous and substitute tool for vegetative propagation of plants. As an emergent technology, the micropropagation of plants has influenced greatly both agriculture and industry by making sure the provision of plants to encounter the ever-growing world demand. It is contributing significantly to the progression of agricultural sciences in current eras and today they establish an essential tool in contemporary agriculture. It is due to that we can generate a huge number of clones from a solitary seed or explants, select required traits, reduce the amount of space needed for field trials and eradicate plant diseases through the vigilant assortment and sterile techniques. This biotechnological tool offers various valuable prospects for crop yield improvement under sterile environments [1].

The system is specified by the very tensile rapid multiplication of plants giving a high proliferation rate in a very small period of time [2]. It is a potential biotechnological tool that has become a commercially viable method of in vitro clonal propagation of a wide range of herbaceous and woody plants [3]. Morel in 1960 first time used this technique for orchid's multiplication and is currently applicable to various plants and it has been proven to be a very effective tool to speed up the creation of superior class pathogen-free plantlets, in terms of genetic and physiological consistencies [4].

The commercial feasibility of these techniques has been demonstrated in many diverse plant species including fruit and vegetable plants. Potato is the world's most imperative non-cereal food crop, and therefore, it is considered one of the major food sources for humankind. Its conventional propagation is asexual, by using the tuber, which allows the accumulation and dissemination of pathogens to new cultivation areas. This fact not only impairs the yield of this solanaceous plant but also threatens the maintenance of genotypes for commercial or breeding purposes. Due to the impossibility of using botanical seed, conservation and exchange of germplasm of this species by means of conventional methods are not feasible. In all potato-producing regions, the demand for high-quality tubers has been paramount to ensure crops production. Thus, biotechnological techniques based on tissue culture are very important [5].

For large scale production of uniform, identical seed material of potato, micro-propagation can be the better alternative over conventional propagation of potato. By using the technique, which involves low-cost components, largescale clonal material can be produced in a short time duration. Use of micro-propagation for commercial seed production has moved potato from test tubes to field. Potato production is being seriously hampered due to certain viruses, fungus and bacterial diseases. Researchers showed that some viruses can decrease the yield by 40% singly and in combination with other viruses, the loss is 90% [6].

Similarly, banana and plantain (*Musa* spp.) are the most important fruit crops of India; the largest banana cultivator on the globe. The most important difficulty though confronted in the banana rising zones is the scarcity of identical and disease-free planting materials, which is due to the vegetative mode of propagation of the plant (through side-suckers) at a slow pace in conventional cultivation. This difficulty can be addressed by employing the commercial tissue

culture technology for mass-production of the popular banana varieties. The said tissue culture technology can also be utilized for conservation & multiplication (as per the requirement) of other locally important, elite, endangered and ornamental banana varieties.

Banana is usually cultivated vegetatively; therefore micropropagation technique offers vigorous means to formulate disease-free implanting resources that can offer the resistance against pathogens in evolving an integrated disease-management program for banana. Nevertheless, commercial tissue-cultured banana seedlings are not always accessible available. Larger-scale banana agriculturalists may desire to create a banana tissue-culture aptitude in-farm to guarantee handiness of disease-free seedlings for cultivation in combination with a practice of abolishing contaminated plants.

Among the top ten ornamental flowers sold worldwide, the tulip takes the third place. Similarly Araucaria heterophylla is a very popular ornamental tree in gardens, Commercially, the propagation of of these ornamental plants is based on the vegetative production of daughter bulbs by the buds located in the axils of the mother bulb scales. Such a type of propagation can cause an accumulation of viruses and their subsequent spreading within daughter bulbs. Viral diseases can drastically affect the yield and quality of plants. When propagating or cultivating ornamental plants, it is essential to start with healthy virus-free bulbs. Micropropagation of selected virus-free plants and elimination of viruses during in vitro culture are the best methods to ensure that the breeding and planting stocks are healthy.

2. Problem Statement

On a commercial scale, potato, banana, tulip and araucaria have vegetative propagation. However, this type of multiplication can accumulate several systemic fungi, bacteria and virus infections that provoke degeneration in the plants, culminating with yield and vigour losses. Thus, the use of virus-free propagative material, with high phytosanitary, physiological and genetic quality is of great importance to ensure that the plant expresses its maximum yield potential.

In this scope, plant tissue culture can be applied to potato, banana, tulip and araucaria production chain in order to efficiently propagate the material of interest, maintain germplasm banks, facilitate genetic exchange, provide the study of this species and of its interactions with biotic and abiotic factors, and to produce genetically modified plants and pathogen-free seed potatoes [11].

3. Objectives

The main objective of the study is the enhancement in the production capacity and commercialization of potato, banana, tulip and araucaria through tissue culture techniques. The objective can be achieved by the following steps:

1. Optimization of protocol for ex-plant sterilization and germination of potato, banana and tulip plants.
2. Optimization of cytokinin concentration for caulogenesis and best shooting response
3. Optimization of auxin concentration for a best rooting response.
4. To acclimatize the in-vitro grown plants and shifting to the greenhouse.

4. Project Team

The project will be conducted under the supervision of HoD Biosciences, Dr Sahar Fazal along with Dr Erum Dilshad, Assistant Professor Biosciences Department and Dr Arshia Amin Butt, Assistant Professor Biosciences Department. MS research students of respective faculty members will be carrying out their research work in this project under the proper guidance of their supervisors. At least 1 or 2 MS students of each faculty member (mentioned above) will be allocated the task of tissue culturing of particular plants mentioned in the project. Dr Sahar Fazal would be supervising the tissue culturing of ornamental plants like araucaria, while Dr Erum Dilshad and Dr Arshia Butt would be dealing with the micropropagation of edible crops like potato, banana and their various varieties.

5. Requirement

5. MS Media
6. Agar
7. Tissue Culture Jars
8. Forceps and Surgical Blades
9. Scissors
10. Blade Holders
11. Petri Plates
12. Growth Hormones
13. Bleaching agents
14. Invertible AC
15. Laminar Flow Hood
16. 01 Attendant

6. Methodology

a. Sterilization

The greatest difficulty in establishing or optimizing the tissue-cultured protocol for potato and banana are mainly because of the fungal, bacterial and viral contaminations. Fungi and yeasts can be controlled by eliminating the contaminated material by previously sanitizing the explants. In this case, plant shoots are disinfested by immersion in 70% alcohol for 15 seconds, followed by immersion for 15 minutes in 1.5% sodium hypochlorite solution with 0.1% Tween-80, and rinsed three times with distilled and autoclaved water [7].

b. Micropropagation

Shoot tips after sterilization will be inoculated in medium containing more cytokinin than auxin for differentiation into aerial parts. Subsequently, these multiplied shoots will be transferred to the medium containing only cytokinin (or not). A shoot tip can generate from 500 to more than 1000 plants, depending on the cultivar or even on the shoot tip. Bandinelli et al. (2013) reported that the 50% reduction in the MS salts concentration during multiplication increases the ex vitro survival rate in Asterix, Macaca, and SMINIA793101-3 potato clones [8]. Similarly, micropropagation protocol for banana will be followed as reported earlier [9]. At the establishment and multiplication stages, plants are kept in a growth chamber, with light (14-16

h photoperiod) and temperature (25-27°C) control. Seedlings can be transferred to a medium richer in sucrose for in vitro tuberization [5].

c. Acclimatization/shifting to greenhouse

In vitro grown plants will be acclimatized to the external environment and finally shifted to the greenhouse before commercialization.

7. Key Milestones and Deliverables

S. No	Elapsed Time in Months	Milestone	Deliverables
1	03	Sterilization and Optimization of Media	<ul style="list-style-type: none"> • Explant Purchase • Optimization of Sterilization • Optimization of Media
2	03	Shooting	<ul style="list-style-type: none"> • Culturing for shoots • Growth of Shoots • Subculturing of Shoots
3	03	Rooting	<ul style="list-style-type: none"> • Optimization of Rooting Medium • Transfer of Shoots for Rooting • Growth of Roots
4	02	Aclimitization	<ul style="list-style-type: none"> • Optimization of Soil Composition, Temperature and Humidity • Transfer of all Plants into Optimized Medium
5	02	Green House Transfer and Dispatch	<ul style="list-style-type: none"> • Growth of Aclimatized Plants • Dispatch of 1st Lot of Plants
6	01	Reporting and Audit	Result Submission and Audit

8. Project Approach

i. Sterilization and Optimization of Media

The first objective is to get the sterilization of seeds and explant done which would be accomplished in a maximum of 2-3 months as optimization of conditions would be performed. At the end of this stage sterilized seeds/ex-plants would be ready for further propagation into the shooting stage.

ii. Plants with Shoots

To get next stage of the plants with proper shoots, previously sterilized seeds/ex-plants will be grown on various combinations of plant growth hormones, this would be requiring 3-4 months at least to get a significant number of plants with shoots.

iii. Plants with roots

After obtaining healthy shoots, rooting will be initiated with a proper hormonal combination. This may require further 2-3 months to get complete rooted plants in a significant number.

iv. Complete Mature Plants

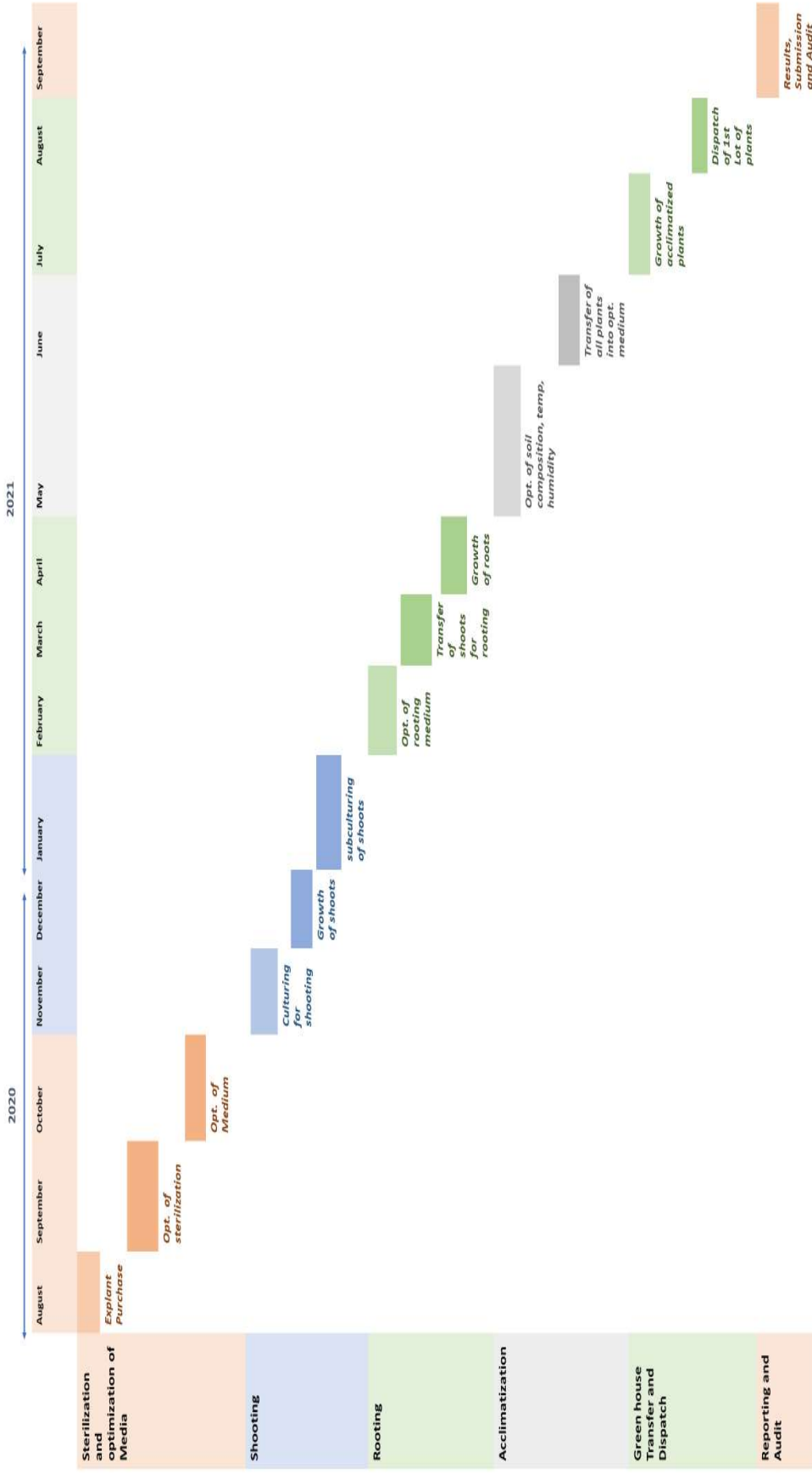
Once tremendous plants with proper shoots and roots are available, they will either be directly supplied to nurseries if demanded or waited for acclimatization. Plants will be shifted to pots containing soil and wrapped with polythene bags. When got hardened and matured, they will be gradually exposed to the external environment and after successful completion of this stage (2-3 months) plants would be ready for supply to the buyer.

9. Financial Demand

The financial demand for the project is Rs. 375,148/- as per the following requirements.

S.N.	DESCRIPTION	MAKE	QTY	RATE	Unit	TOTAL
1	MS Media Powder Form	USA	4x100L	12500.0	100L	50,000.0
2	Agar	Sigma/Bio World	500gm	7000.0	500gm	7000.0
3	Tissue Culture Jar	Local	100Pcs	55.0	Each	5500.0
4	Forceps small 4"	S.Steel	2Pcs	375.0	Each	750.0
5	Forceps Large 6"	S.Steel	2Pcs	1100.0	Each	2200.0
6	Petri Plates 20x100mm	Germany	100pcs	165.0	Pair	16500.0
7	BAP 6-benzylamino purine	Sigma /Phyto	25gm	8500.0	25gm	8500.0
8	1-Napthalene Acetic Acid	Sigma	25gm	5500.0	25gm	5500.0
9	Gibberelic Acid	Sigma	5gm	6500.0	5gm	6500.0
10	Chlorox Bleach	Imported	5x1.75Lit	850.0	8.75 Lit	4250.0
11	Ethanol 95%	Merck	5x2.5L	1800.0	12.5L	9000.0
12	Terbinafine	Sigma	1gm	18000.0	1 gm	18000.0
13	Cefotaxime Sodium salt	Imported	5gm	16000.0	5 gm	16000.0
14	Laminar Flow Hood	China	01	170940.0	Each	170940.0
Total						PKR 320,640/-
GST 17%						PKR 54,508/-
G.Total						PKR 375,148/-

10. Timeline



11. Commercialization and Stake Holders

Following end users were identified based on demand of ornamental plants and edible crops:

- i. Distributors of Potato seeds in Northern areas of Pakistan
- ii. Distributors of sterilized, invitro plants of Banana in Khairpur and other interior Sind areas initially.
- iii. At later stages, after completely optimizing protocols and a lot of acclimatized plants in green house international collaboration will be seeked.

For ornamental plants initially nurseries and flower distributors will be approached. At later stages different industries (Perfumery distillation industries) will be approached for precious and rare plants local production.

12. Expected Outcome (Reseach & Commercial Output)

Plant tissue culture is one of the most rapidly growing areas of biotechnology because of its high potential to develop improved crops and ornamental plants. With the advances made in the tissue culture technology, it is now possible to regenerate species of any plant in the laboratory. Plant tissue cultures is associated with a wide range of applications, the most important being the production of pharmaceutical, medicinal and other industrially important compounds.

The project involves wide range of research including study of new varieties of plants and seeds. The outcome of paper will be documented in research journals and filing of National and International patents. The knowledge gained in the process will help to produce projects at MS and PhD level.

Commercially the project will help to establish a tissue culture supply chain of ornamental, banana, potatoes plants to various nurseries and vendors.

13. References

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Capital University of Science and Technology, Islamabad

Certificate Courses Fall-2020

Class Timings: 06PM-09PM (Once in a Week)

Civil Engineering

Course Title

- ❖ Structural Fire Engineering
- ❖ Advanced Open Channel Hydraulics

Resource Person

Engr. Prof. Majid Ali
Dr. Ishtiaq Hassan

Computing

Course Title

- ❖ Data Mining
- ❖ Applied Cryptography
- ❖ Mobile and Wireless Networks

Resource Person

Dr. Muhammad Shahid Iqbal
Dr. Mohammad Masroor Ahmed
Prof. Amir Qayyum

Electrical Engineering

Course Title

- ❖ Pattern Recognition
- ❖ Linear System Theory
- ❖ Control System Design
- ❖ Principles of Digital Communications
- ❖ Complex Variables and Transforms(Morning)

Resource Person

Prof. Imtiaz Ahmed Taj
Prof. Aamer Iqbal Bhatti
Prof. Raza Samar
Prof. Noor Muhammad Khan
Prof. Aamer Iqbal Bhatti

Mechanical Engineering

Course Title

- ❖ Manufacturing System Design and Analysis
- ❖ Thermal Design of Heat Exchangers
- ❖ Operations Research
- ❖ Engineering Management Techniques

Resource Person

Dr. Salman Sagheer Warsi
Dr. Muhammad Irfan
Engr. Dr. Taiba Zahid
Engr. Dr. Taiba Zahid

Registration Forms are available at **ORIC Office, CUST** and on CUST Website <https://cust.edu.pk/downloads>. Submit the Filled Application Forms in **ORIC Office, H-Block, Ground Floor** not later than **Saturday, 12th September, 2020**.
Course Registration Fee: **27,000 PKR**. Class Timings: **6 PM-9 PM (Once in Week)**
For further queries Contact: **M. Raheel Anjum, Assistant Director, ORIC, CUST**
📞 03315293054 ✉ raheel.anjum@cust.edu.pk

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Amazon VA Based Trading



What is Amazon VA

Virtual Assistant (VA) is someone who works remotely in Amazon Business

Project Features

- ✓ Product Sourcing
- ✓ Customer Service
- ✓ Product Research
- ✓ Social Media Management
- ✓ Administrative Assistance



Project Lead

✓ Maria Amin



✉ mariaamin744@gmail.com

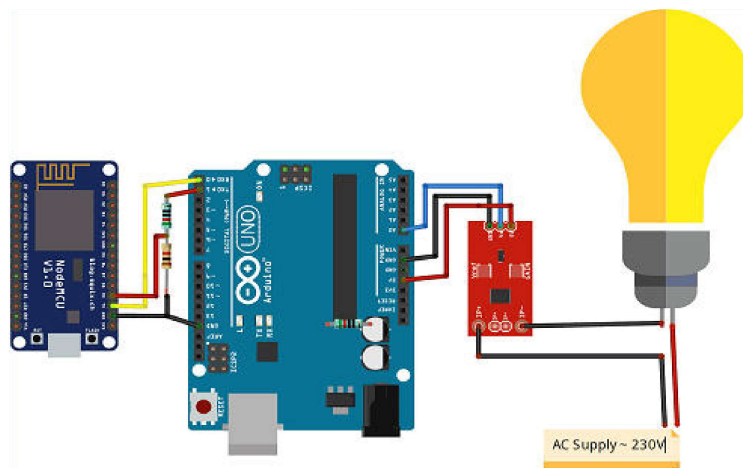
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IoT Based Power Automation & Control



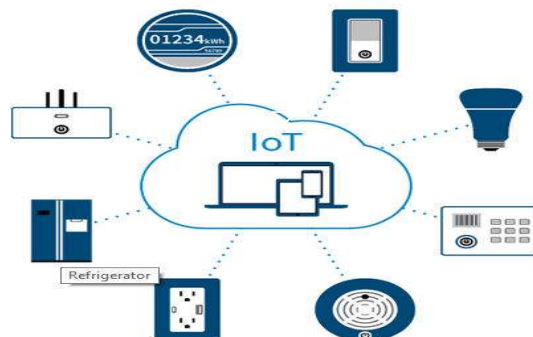
Project Features

- ✓ IOT and Cloud Computing
- ✓ Sensors integration & Connectivity
- ✓ IOT and Cloud Computing
- ✓ Data Processing & User Interface
- ✓ Power Analysis



Project Lead

- ✓ Mr. Suleman Nadeem



✉ suleman@sig2sol.com

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**Consultancy Proposal/Agreement for the Structural Evaluation of
the Under Construction Commercial Building at Bahria Enclave,
Islamabad**

1. Background

Engineering & Design Consultants (E&DC), a designing firm, is looking for the consultant who can perform structural evaluation of the under construction commercial building at Bahria Enclave, Islamabad. In this regard, Engr. Ghazi Arslan Ahmed, Principal Structural Engineer from E&DC contacted Engr. Prof. Dr. Majid Ali, Department of Civil Engineering, Capital University of Science and Technology, Islamabad.

2. Expression of Interest

Engr. Prof. Dr. Majid Ali, Capital University of Science and Technology, Islamabad along with his team members Engr. Iqbal Ahmad, Lecturer, Mr. Ali Haider and Mr. Nadeem Shehzad (Lab technicians), intends to undertake. Engr. Prof. Dr. Majid Ali has a vast experience of industry (NESPAK) in structural analysis, design, evaluation etc. Engr. Iqbal Ahmad has an experience of industry more than 4 years being structural engineer and is familiar with structural analysis, design and evaluation. Mr. Ali Haider and Mr. Nadeem Shehzad are familiar with performing non-destructive tests of concrete. The steps for carrying out the proposed work, scope of the work, time lines and remunerations are given in subsequent sections. In case proposal is accepted, this document will serve as formal agreement of Capital University of Science and Technology, Islamabad and E&DC.

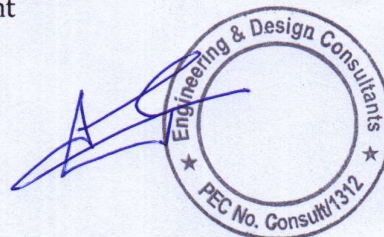
3. Steps for Performing the Proposed Work

The following steps shall be carried out for doing the proposed work:

1. Study of architectural & structural drawings and selection of number of locations for testing.
2. Site visit for confirmation of location selections.
3. Approval of number of tests.
4. Performing field tests i.e.
 - a. Detailed visual inspection
 - b. Schmidt hammer test
5. Detailed analysis
6. Report

Note:

- (a) Transport will be provided by client.*
- (b) Clear access to requested locations shall be provided by client.*
- (c) Few tests like rebar scanner test and pulse velocity test are excluded on request of client.*



**Consultancy Proposal/Agreement for the Structural Evaluation of the Under Construction
Commercial Building at Bahria Enclave, Islamabad**

4. Scope of Work

The scope of work shall be as follows:

Table: Proposed number of structural elements for testing

Storey	Structural Elements			
	Footings	Columns	Beams	Slabs
Lower Ground	6	6	9	3
Upper Ground	-	6	9	3
First Floor	-	6	9	3
Sub Total	6	18	27	9
Grand Total	60			

Number of tests per location per structural element = $3 \times 3 = 9$

Total tests = $9 \times 60 = 540$

5. Remunerations

Remunerations against different task shall be as follows:

Table: Different heads

Sr. No.	Task	Fee (Rs.)	Remarks
1	Drawing study	5,000/-	For the field tests, equipment from the university shall be utilized. The equipment will be returned in safe and sound condition to the lab by the technicians involved in the project.
2	Site visit	3,000/-	
3	Field tests (i) Visual inspection (ii) Schmidt hammer test	22,000/- $540 \times 120 = 64,800/-$	
4	Detailed analysis / correlations	22,000/-	
5	Report	3,200/-	
6	Total amount	1, 20, 000/-	

Note:

1. 540 is the number of total tests.

2. Total amount is exclusive of tax.

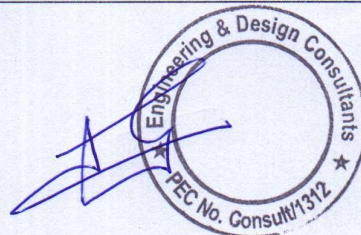
3. 50% shall be paid in advance. 50% shall be paid after final report submission.

6. Duration of the Project

The time duration for the project shall be 15 working days from signing of this agreement.

7. Design Team

The brief overview of Team Members is as under:



**Consultancy Proposal/Agreement for the Structural Evaluation of the Under Construction
Commercial Building at Bahria Enclave, Islamabad**

**I. Engr. Prof. Dr. Majid Ali, Capital University of Science and Technology,
Islamabad, Pakistan..... (Team Lead)**

Engr. Prof. Dr. Majid Ali is currently working as a Professor at Civil Engineering Department of Capital University of Science and Technology, Islamabad, Pakistan. He is teaching subjects and conducting research related to Structural Engineering. He obtained his Doctor of Engineering degree from the University of Auckland, Newzealand, in 2013. His doctoral research work is focused on the fiber reinforced composites for structural applications. Before Joining Academia, he was serving as Senior Structural Design Engineer in National Engineering Services of Pakistan (NESPAK, the top most consultancy of Pakistan). He has 10 years of affiliation with NESPAK with experience in the field of structural engineering. He has done similar kind of projects (structural evaluation) in NESPAK.

**II. Engr. Iqbal Ahmad, Lecturer, Capital University of Science and Technology,
Islamabad, Pakistan (Team Member)**

Engr. Iqbal Ahmad is currently working as a Lecturer at Civil Engineering Department of Capital University of Science and Technology, Islamabad, Pakistan. He has obtained his BS degree in Civil Engineering from UET Peshawar, Pakistan in 2013 and MS in Civil Engineering (Structural Engineering) from Capital University of Science and Technology, Islamabad, Pakistan in 2017. His MS research is focused on the seismic analysis of high-rise structure in seismic zone-4. He has the experience of more than 4 years in structural analysis and design.

**III. Mr. Ali Haider and Mr. Nadeem Shehzad, Lab Technicians, Capital University
of Science and Technology, Islamabad, Pakistan (Team Members)**

Mr. Ali Haider and Mr. Nadeem Shehzad have done diploma of associate engineering in civil and are experienced lab technicians. They perform different lab tests to students of civil engineering at undergraduate level. They are familiar with the use of equipment's required for this project.

8. Required data and Queries from E&DC:

- (i) Architectural and Structural Drawings of building in AUTOCAD format
- (ii) Transport to the site
- (iii) Clear access to the requested locations

9. List of Deliverables:

The design report shall include, but not limited to following:

- (i) Detailed analysis report



**Consultancy Proposal/Agreement for the Structural Evaluation of the Under Construction
Commercial Building at Bahria Enclave, Islamabad**

Signed for and on behalf of CUST

Name: Prof. Aamer Iqbal Bhatti

Title/Position: **Dean ORIC**

Capital University of Science and
Technology, Islamabad

Date: 12-10-2020

Signed for and on behalf of E&DC

Name: Engr. Ghazi Arslan Ahmed

Title/Position: **Principal Structural Engineer**

Engineering & Design Consultants (E&DC),
Islamabad

Date: 20-10-2020

