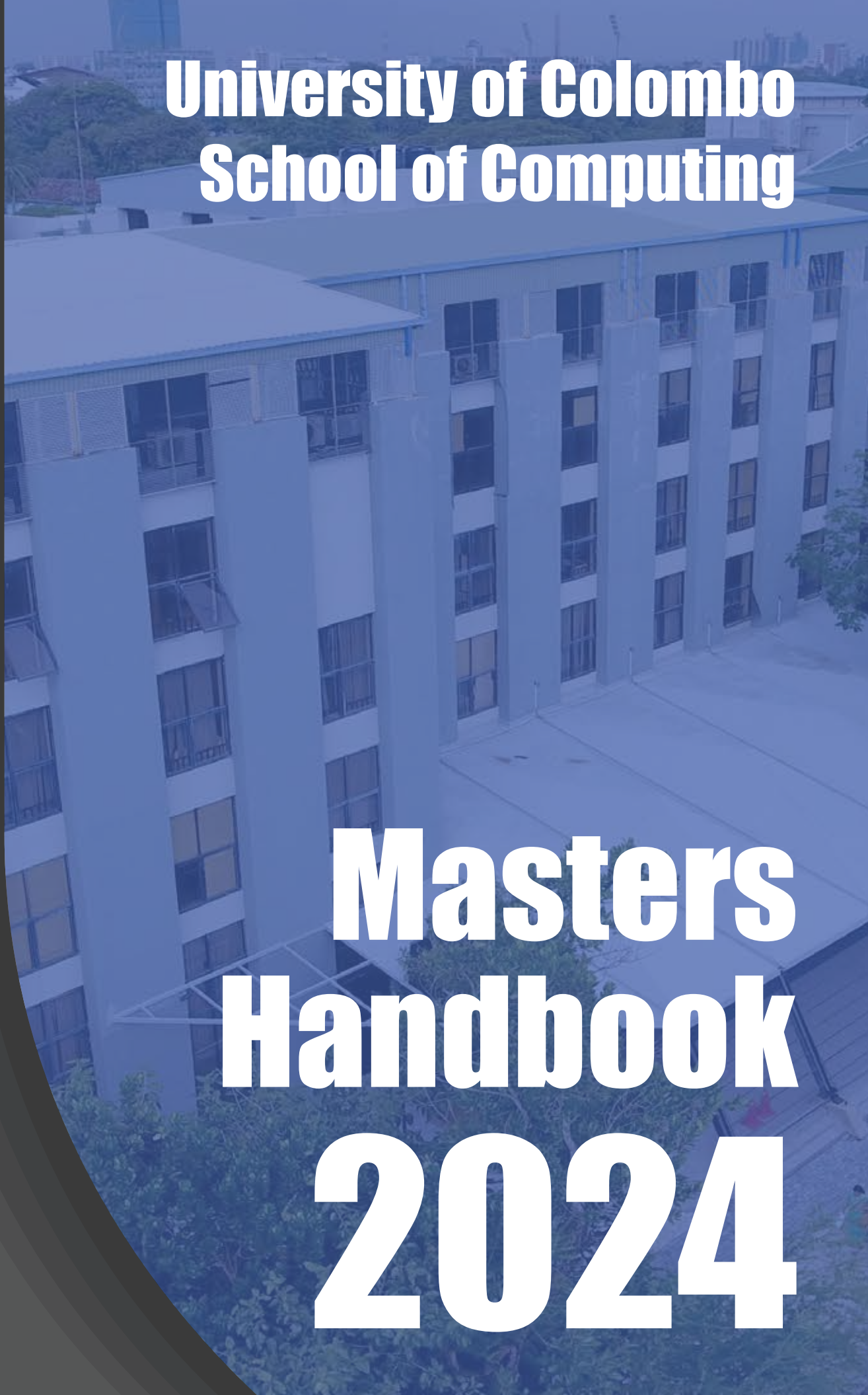
UCSC

University of Colombo School of Computing



Masters Handbook 2024



University of Colombo School of Computing

MASTERS STUDENT HANDBOOK 23/2024

Master of Computer Science
Master of Science in Computer Science
Master of Information Technology
Master of Information Security
Master of Business Analytics
Master of Cybersecurity



Disclaimer

This handbook is compiled with information received up to January, 2024.

It is hereby informed this Handbook is only for general information and does not represent accurately the relevant By-Laws and Regulations.

Any information contained herein should be confirmed by reference to the relevant authority.

For the latest version of the handbook please visit our website

http://www.ucsc.cmb.ac.lk



Vision

Be a global leader in computing, advancing the frontiers of new knowledge through learning and research.

Mission

To advance and enhance computing knowledge, fostering global strategic alliances, promoting crossdisciplinary research, producing socially responsible professionals with entrepreneurial skills, leadership qualities and integrity contributing to position the country as a knowledge hub in the region.



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MESSAGE FROM THE DIRECTOR



On behalf of the University of Colombo School of Computing (UCSC), it gives me immense pleasure to welcome you to the Master's Degree Programme for the academic year 2024. Postgraduate studies in computing at the UCSC is one of the important programmes that we manage on behalf of the University of Colombo and these programmes were started at UCSC almost three decades ago. From the beginning, the UCSC has been achieving eminence above every other computing learning center in Sri Lanka with the tremendous contribution of highly qualified academic staff that includes more than 30 senior lecturers with doctoral level qualifications. Each member of our academic and nonacademic staff is dedicated to the development of the students of our institute. As a higher learning center, we have been privileged to receive a high reputation and recognition from the industry, and this has opened the path to a high rate of employment for the graduates. Simultaneously, we have well-established research groups with international recognition and high level of the curriculum complies with ACM IEEE curriculum Standards.

The Master's Degree programme has been specially designed for graduates with a computing degree who wish to obtain a postgraduate qualification from the prominent metropolitan university. While enhancing knowledge, this also provides a stepping stone for further research in the field. The Master's Degree programme has a long history at UCSC.

UCSC, as a centre of higher education, is committed to providing an environment that is conducive to carry out the vision and the mission of our institute. Our strategic goal is to focus on the quality of our degree programmes while also developing the quality of our students and ultimately enhancing their employment prospects. Finally, I would like to extend you my very best wishes for success in your studies and with your new higher learning experience at the UCSC on behalf of all the members of the school.

Dr. D A S Atukorale
Director,
University of Colombo School of Computing

AN APPRECIATION OF THE FOUNDER DIRECTOR OF THE UCSC

Vidya Jyothi Professor
V. K. Samaranayake (1939 – 2007)



Vanniarachchige Kithsiri Samaranayake was born on the 22nd of May 1939 and had his early education in Hewavitharana Vidyalaya, Rajagiriya, where his father was the principal and his mother was a teacher. He entered Ananda College in 1948 and then Royal College through a competitive examination in 1950.

Prof. V.K.Samaranayake entered the University of Ceylon to read for a degree in Science in 1956 having completed his secondary education at Ananda and Royal Colleges. He was selected to do a Special degree in Mathematics and obtained a First Class Honours degree in 1961.

Prof. Samaranayake entered the Imperial College, London in 1963 on a state scholarship for his postgraduate studies and then moved on to University College, London to complete his PhD in record time before returning home in 1966. At the age of just 35, in recognition of his great scholarship, the University of Colombo appointed him to its highest Academic position of Professor of Mathematics in 1974. He was subsequently appointed Senior Professor of Mathematics in 1984, invited to be the first Senior Professor of the newly created Chair in Computer Science in 1996 and appointed Emeritus Professor of the University of Colombo after his retirement in 2004. In recognition of which the University honoured him with the title Professor Emeritus of Computer Science, and conferred on him the Degree of Doctor of Science, Honoris Causa at its subsequent Convocation.

As it is not possible to confine the appreciation of his enormous service to the nation and his illustrious career as an academic and an administrator to a few pages, some of the significant milestones of his illustrious career are outlined below.



- 1987 - 1999 he held the position of the Chairman of the Computer and Information Technology Council of Sri Lanka (CINTEC). During this period he was also tasked with chairing the Presidential Task Force on Integrated R & D in Science & Technology 1997-2000 and the National Y2K Task Force in Sri Lanka 1998-2000.

- 1992 - He initiated the participation of Sri Lankan school children in Computer Programming, by committing CINTEC funds for sending teams of 4 to the International Olympiad in Informatics (IOI).

- In 1995 he was instrumental in setting up intensive discussions with Sri Lanka Telecom, to commence Internet services in Sri Lanka. These discussions eventually brought LEARN and Internet connectivity to Sri Lanka in 1996.

- He was instrumental in forming the IT for Computer Training Organizations (ACTOS), for the Software Industry (SLASI), and for the Computer Vendors (SLCVA).

- He also created the umbrella organization for these associations in the form of the Federation of IT Industry Associations (FITIA).

- In 1984 he was successful in building up Academic Faculty in Computer Science at the University of Colombo. Starting with the Statistical Unit, the Statistical Computing and Data Processing Centre within the Mathematics Department, Prof. Samaranayake first convinced the University to set up a Department of Statistics and Computer Science in 1985, the first of its kind in Sri Lanka, and then went onto create the first School in the university system in the form of the University of Colombo School of Computing (UCSC) in 2002.









- Commencing in the year 2000, Prof. Samaranayake initiated another major milestone in ICT HRD in Sri Lanka with the launch of the innovative Bachelor of Information Technology (BIT) External Degree programme. Apart from the prestige of a University of Colombo degree to students, the BIT programme also has the indirect but most desirable effect of standardizing ICT education of an era where commercialism is threatening the quality of education.

- His quest for capacity building in ICT human resources can be seen more clearly by his single-handed contribution in this area at the University of Colombo – making it the showcase among the entire university system in Sri Lanka and beyond. Investing in human resource development in ICT is also a huge risk – that of aiding in the brain drain. This is where Prof. Samaranayake's broadness of vision and almost unreasonable trust, especially in the case of training Faculty of the University, is most clearly seen. Commencing with the meagre funding resources extended by donors in 1970s an era when the developed countries themselves were just getting into the area of serious ICT human resource development, Prof. Samaranayake commenced his quest of directing all local and foreign funding to develop ICT Human Resource development at the University of Colombo.

- In recognition of his towering contribution in the field of ICT in the country, he has been bestowed with several national awards in the form of the Lions' Club Gold Medal for the Most Outstanding Citizen of Sri Lanka in 1986, the Vishva Prasadini Award in 1996 on the occasion of the 80th birthday of the then Prime Minister Sirimavo Bandaranaike and the Vidya Jyothi Presidential Award in 1998.

- In recognition of his towering contribution in the field of ICT in the country, he has been bestowed with several national awards in the form of the Lions' Club Gold Medal for the Most Outstanding Citizen of Sri Lanka in 1986, the Vishva Prasadini Award in 1996 on the occasion of the 80th birthday of the then Prime Minister Sirimavo Bandaranaike and the Vidya Jyothi Presidential Award in 1998.

01

Introduction



Sri Palee Campus

UNIVERSITY OF COLOMBO

The University of Ceylon was established by the state council in April 1942. By 1950, the University of Ceylon had gained a reputation as an important centre of excellence in the Commonwealth. The Higher Education Act of 1966 established a National Council of Higher Education (NCHE) and later in 1972, under the University of Sri Lanka Act No. 1 of 1972, all universities were brought under one umbrella and made campuses of a single university and established as the University of Sri Lanka.

The University of Ceylon, Colombo was named the Colombo Campus of the University of Sri Lanka. This system prevailed until 1977. The University autonomy was weakened and as a result, a new Act was introduced in 1978. Under the Universities Act No. 16 of 1978, all campuses of then single university became independent universities. Accordingly, the University of Colombo, Sri Lanka regained its autonomy in 1978. The University of Colombo now consists of five faculties, one school (University of Colombo School of Computing), four institutes and several centers in addition to the Sri Palee Campus.

The University of Colombo is a public state university located primarily in Colombo, Sri Lanka. The University of Colombo is the oldest institute of modern higher education in Sri Lanka, specializing in the fields of natural, social, and applied sciences as well as mathematics, computer sciences, medicine, education, and law. It has been ranked among the top 10 universities in South Asia.

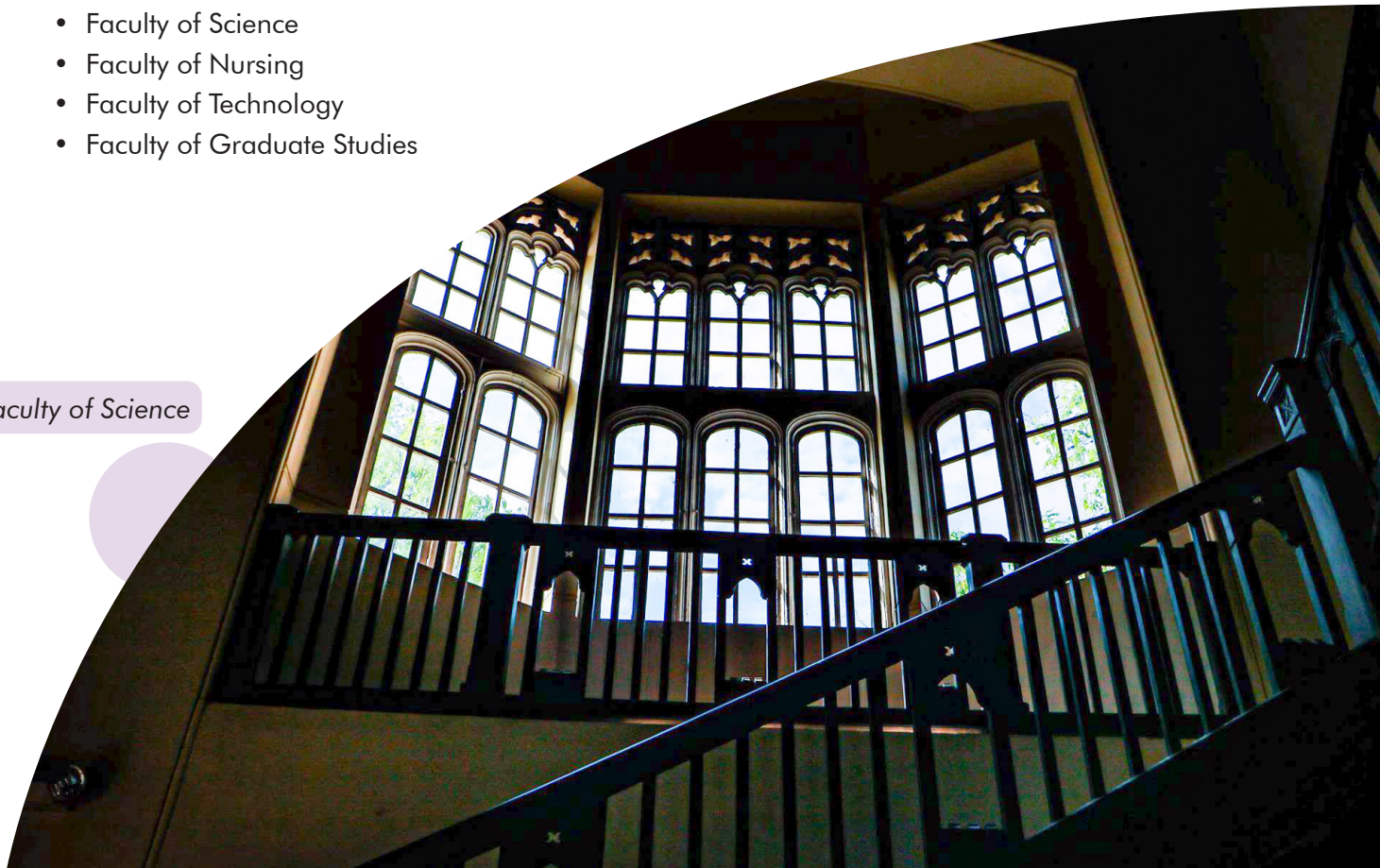


The University of Colombo with a proud history of over 115 years continues in its endeavor to meet the challenge of maintaining its position as the "Metropolitan University, Modern and International in Outlook and Character". The location of the University affords the student population all the advantages of a "metropolitan university", with easy access to international information/ resource centres, libraries, theatres, sports complexes etc.

Its central location within the City of Colombo provides easy access to a wide range of cultural, entertainment and business facilities. The University of Colombo has a multi-cultural multi-ethnic student and staff population, fostering social harmony, cultural diversity, equal opportunity and unity.

The University of Colombo has nine Faculties with 56 Academic Departments, a Campus, a School, 7 Institutes and 8 centres. The following faculties cater to undergraduates as well as postgraduates of the respective disciplines.

- Faculty of Arts
- Faculty of Education
- Faculty of Law
- Faculty of Management and Finance
- Faculty of Medicine
- Faculty of Science
- Faculty of Nursing
- Faculty of Technology
- Faculty of Graduate Studies



Faculty of Science

DIRECTORS



Dr. D A S Atukorale

2022-Present



Professor K P Hewagamage

2016 - 2022



Late Professor
G N Wikramanayake

2010 - 2016



Dr. A R Weerasinghe

2004 - 2010



Late Vidya Jyothi Professor
V K Samaranayake

2002 - 2004



05
UNDERGRADUATE DEGREES

≈ 900
STUDENTS

01
EXTERNAL DEGREE

≈ 5000
STUDENTS

06
MASTERS DEGREES

≈ 450
STUDENTS

03
RESEARCH DEGREES

≈ 50
STUDENTS

OUR DEGREE PROGRAMMES

Internal Undergraduate Degree Programmes

Bachelor of Science in Computer Science (BSc. in CS)

Bachelor of Science Honours in Computer Science (BSc. (Hons) in CS)

Bachelor of Science Honours in Software Engineering (BSc. (Hons) in SE)

Bachelor of Science in Information Systems (BSc. in IS)

Bachelor of Science Honours in Information Systems (BSc. (Hons) in IS)

External Undergraduate Degree Programme

Bachelor of Information Technology (BIT)

Postgraduate Degree Programmes

Master of Computer Science (MCS)

Master of Science in Computer Science (MSc. in CS)

Master of Information Technology (MIT)

Master of Information Security (MIS)

Master of Business Analytics (MBAnalytics)

Master of Cybersecurity (MCyberSec)

Postgraduate Research Degrees

Doctor of Philosophy in Computing (PhD)

Master of Philosophy in Computing (MPhil)

MILESTONES OF POSTGRADUATE TAUGHT COURSES AT UCSC/ DCS/ DSCS/ ICT

2021	Master of Computing by Research
2018	Master of Business Analytics Master of Cybersecurity
2017	Master of Information Technology, Master of Information Security, Master of Computer Science, Master of Science in Computer Science
2009	Master of Science in Information Security
2002	Master of Information Technology, Master of Computer Science, Master of Advanced Computing
1990	Inaugral MSc in Computer Science with the assistance of Cardiff University (UK) with funding from UNDP
1988	Postgraduate Diploma in Information Technology with the assistance of Japan International Cooperation Agency - JICA
1986	Postgraduate Diploma in Computer Applications

Opening of the Colombo University Computer Museum by Senior Prof. Chandrika Wijeyaratne

COMPUTING LEGACY @ UOC

As part of the centennial celebrations of the Faculties of Science and Arts of the University of Colombo and of the University Library, the University of Colombo School of Computing (UCSC) unveiled the 'University of Colombo Computer Museum' at its premises, the first of its kind in Sri Lanka, along with an online e-museum at http://emuseum.ucsc.cmb.ac.lk. This was inaugurated by the Vice Chancellor, University of Colombo, Professor Chandrika Wijeyaratne on 21st January 2021, at the UCSC.

The emuseum will provide a virtual immersive experience to the public, especially to the younger generation allowing them to embark on a journey of technological discovery of the evolution of computers, which has now become an integral part of the social life of every human.





1921 - 2021

University of Colombo





1970

The Statistical Unit was formally approved by the Senate of the University of Ceylon, Colombo, at its 20th meeting held on 26-06-1970 as a unit for the entire university to undertake statistical and data processing



1972

The Department of Mathematics and the Statistical Unit of the University of Colombo made a ground-breaking attempt to initiate new course units in Mathematics, Statistics and Fortran Programming leading to Statistical Services job stream for the students with the new Special Degree in Development Studies in the Faculty of Arts.



1977

Under the Colombo-Reading Collaboration, the Department has gifted an HP 9825 Mini Computer with a Card Reader



1980

A Data General Eclipse NOVA/4 minicomputer was obtained by a loan in 1980 for one year and housed in the Department of Mathematics



1981

The first minicomputer Data General Eclipse Model S/140 was purchased with time-sharing OS and 16 VDU for Fortran and Cobol Programming



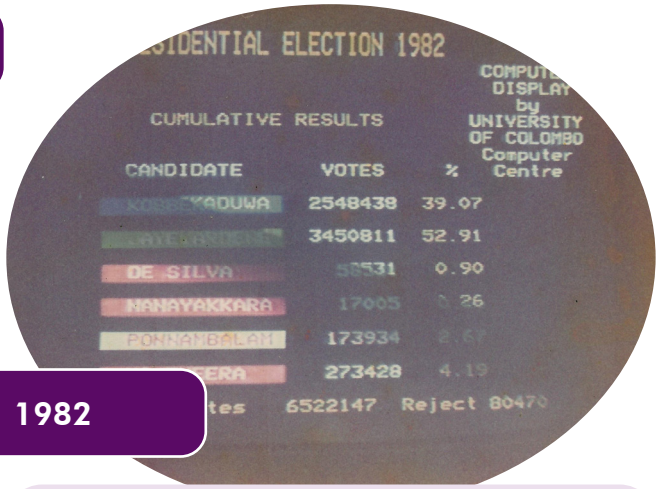
1981

Establishment of Computer Centre



1981

The Department of Mathematics granted its first local PhD in Computing and Statistics for the first time in the history of the University Education in Sri Lanka



1982

BBC computers were used to process and release, to Rupawahini, the national TV the results of the 1982 presidential elections (first ever computerization of a national event); proliferation of BBC microcomputers over Econet, the first LAN for file sharing, printing and Basic programming in a 30 machine PC lab; Introduction of first-generation personal computers- KayPro CP/M.


DAILY NEWS

tension course

computer programming

The University of Colombo has started an extension course in computer programming according to a spokesman for the University. has been organised Department of tics of the

A large number of potential students of computer science have benefited by this extension course which cheap c charges institutic

An advan

1982

Three Certificate courses in Computer Applications, specially designed for users in Scientific, Technological and Financial & Management were introduced. Three courses are Certificate Course in Computer Applications in Science and Technology using FORTRAN, Certificate Course in Computer Applications in Financial & Management using BUSINESS BASIC and Certificate Course in Computer Applications in Finance & Management using COBOL.



1983

Establishment of Micro Computer Laboratory for the Computer Center



1984

Introduce the International Course on Statistics and Agriculture



1985

Establishment of the Department of Statistics and Computer Science (DSCS)



1986

Local Language Development



1987

Establishment of the Institute of Computer Technology (ICT) (Funded by JICA)



1988

UNICODE Initiative



1992

Commencement of Third Country Training Programs (TCTP) (Supported by JICA)



1996

National Website for Sri Lanka



1999

Institute of Computer Technology Presented with JICA President's Award



2000

Introduction of the Bachelor of information Technology (BIT) External Degree Programme



2002

Establishment of the UCSC by the merge of the ICT & DCS University of Colombo School of Computing

KEY STRENGTHS

Highly Qualified Academic Staff



Competency of the academic staff is one of the crucial factors in UCSC's focus on high-quality academic excellence. The UCSC presently has 01 Senior professor, 30 PhD qualified academics graduated from leading universities in UK, Canada, Australia, Japan, Sweden etc., 08 MPhil and Masters qualified staff to serve in the academic activities. Another key strength of the staff is their expertise in diverse domains in Computing. The academic staff publish their research findings in reputed Journals and Conferences each year. The human resource which has been built up over a long period of time with foresight as a long-term investment is now bearing rich dividends.

Strong Research Potential



With the strong research training investment over the past decades, the UCSC now possesses arguably the strongest research potential in computing in Sri Lanka; one which matches that which is available in the best of international universities. UCSC is reputed for its international collaboration with research teams in Europe and Asia through the funding agencies such as Japan International Corporation Agency (JICA), Swedish International Development Agency (SIDA), International Development Research Centre (IDRC). Several recent research outcomes at UCSC have received local and international awards.

Healthy Industry-University Relationship



The Professional Development Centre (PDC) of the UCSC develops and promotes strategic relationships with key organizations in the Information Technology industry. PDC places over 300 students each year on an internship as a part of their undergraduate degrees in the software industry for a period of six months. The Computing Services Centre (CSC) of the UCSC undertakes consultancy work for state and private sector organizations. The CSC also conducts short term training courses in diverse areas of emerging technologies.

Funding and Facilities



One of the cornerstones of the success of the UCSC and its predecessors has been the international level facilities available to faculty and students. It has been one of the key factors through which staff retention has been possible. This resource has been strengthened over the years through the support of international donor agencies which has been readily forthcoming owing to our past track record. In addition to this, the UCSC's earning through consultancy and research has made it self-sufficient with respect to operational expenses and the acquisition of state-of-the-art infrastructure.

OUR ORGANIZATION

The primary activity of the University of Colombo School of Computing is to deliver quality undergraduate and postgraduate degree programmes in computing. The UCSC has three academic departments, eight administration and finance divisions and six centres. The academic staff is allocated to the three academic departments based on their specialization and teaching expertise. The main administration and operational units of UCSC are shown in Figure 1.

Academic departments

Academic Departments	Department of Computation and Intelligent Systems (CIS)
	Department of Communication and Media Technologies (CMT)
	Department of Information Systems Engineering (ISE)

Centres

Centres	Advanced Digital Media Technology Centre (ADMTC)
	Centre for Digital Forensics (CDF)
	Computing Service Centre (CSC)
	External Degrees Centre (EDC)
	e-Learning Centre (eLC)
	Professional Development Centre (PDC)

Board of studies

BoS: Board of Studies, which consists of IUD, RHD and EEP	Internal Undergraduate Degrees (IUD)
	Research and Higher Degrees (RHD)
	External and Extension Programmes (EEP)

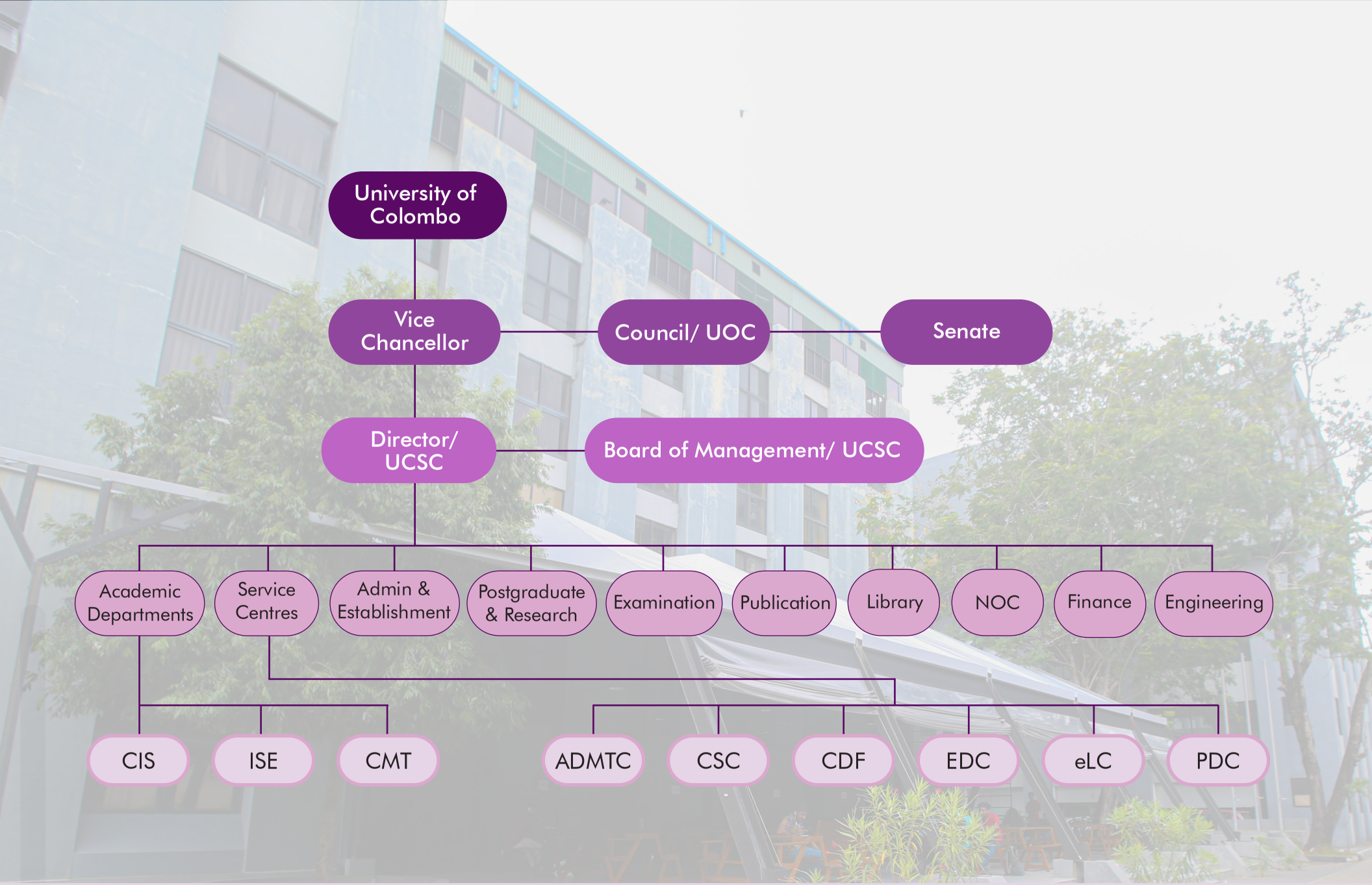


Figure 1: Administration and Operational Units



Vidya Jyothi Prof V. K. Samaranayake Auditorium

CENTRES OF THE UCSC

UCSC also performs several secondary activities. These activities are organized under six separate centres. Each centre has a coordinator who manages the day-to-day operations of the centre. The six centres are as follows:

Advanced Digital Media Technology Centre (ADMTC)

Advanced Digital Media Technology Centre (ADMTC) was established under the UCSC in order to implement the "Project for Human Resource Development in Information Technology through capacity building of the UCSC" that was supported by JICA. The centre is equipped with a state of the art digital studio and multimedia laboratories. Centre also conducts several training programmes in Multimedia, e-Learning and Digital Media Production. ADMTC produces many UCSC videos including BIT TV programmes.

Coordinator: Dr. S. S. P. Mathara Arachchi

For more details visit the website: *https://ucsc.cmb.ac.lk/admtc*

Centre for Digital Forensics (CDF)

Centre for Digital Forensics (CDF) of the UCSC was established in 2011. The advisory panel consists of UCSC and foreign academics. UCSC has played a key role in assisting the Sri Lanka Police and the Criminal Investigation Department since 2003. The centre investigates evidence of digital crimes.

Coordinator: Dr. T N K De Zoysa

For more details visit the website: *http://www.ucsc.cmb.ac.lk/cdf*

Computing Services Centre (CSC)

The Computing Services Centre (CSC) of UCSC is the main consultancy arm of the UCSC. It conducts system design and development, system recommendation, software project consulting, recruitment testing, tender evaluation, feasibility study and acceptance tests for computer hardware and software. It also conducts tailor-made training programmes for the organizations in both the private and public sectors. The computer service centre also undertakes some software development projects depending on the availability of staff and resources.

Coordinator: Dr. Shiromi Arunathilake

For more details visit the website: *http://www.ucsc.cmb.ac.lk/csc*

External Degrees Centre (EDC)

The main purpose of establishing the External Degrees Centre (EDC) and the three-year external degree programme, Bachelor of Information Technology (BIT) is to widen the higher educational opportunities for the students who have been unsuccessful in meeting the competitive eligibility criteria for admission to the state university system. Another reason has been the massive demand from the ICT industry for high-quality human resources far exceeding the number provided by the state universities. The BIT degree programme commenced in the year 2000 and has so far produced 3034 graduates so far and almost all have been absorbed by the ICT industry. Internal students of the University of Colombo have the right to follow BIT degree programme since it is a part-time programme.

Coordinator: Mr. W V Welgma

Academic Coordinator: Dr. (Ms.) K H E L W Hettiarachchi

For more details visit the website: *http://www.bit.lk*



BIT Convocation

E-Learning Centre (e-LC)

The UCSC was identified by donor agencies such as the Swedish International Development Agency (SIDA) and the European Union Asia Link Programme as an ideal organization for a centre of excellence in e-Learning. In 2003, the e-Learning Centre (e-LC) was established to provide an online learning environment for all its internal and external students. The centre provides the necessary support to develop and maintain interactive e-Learning content and environment. Also, the online virtual learning environment of the BIT degree programme (http://vle.bit.lk) is managed by them.

Coordinator: Dr. M I E Wikramasinghe

For more details visit the website: *http://www.ucsc.cmb.ac.lk/elc*

Professional Development Centre (PDC)

The Professional Development Centre (PDC) of the UCSC was set up to keep a close liaison with the IT industry and to improve the academic programmes through industry partnership. The PDC primarily concentrate on improving the professional skills of the staff and the internal students, industrial placements and visits for internal undergraduates and promoting inter-cultural harmony. The mission of the Professional Development Centre (PDC) of the UCSC is to produce Computing graduates' having extra-curricular skills such as professional skills, business skills, communication skills, community service skills, innovative capacity and entrepreneurship to pursue successful careers thereby contributing to the socio-economic development of Sri Lanka.

Coordinator: Dr. P V K G Gunawardana

For more details visit the website: *http://www.ucsc.cmb.ac.lk/pdc*

Research Area



UCSC

UCSC RESEARCH LABORATORY

UCSC plans to inaugural open for its State-of-the-art research facility UCSC Research Laboratory in 2021. The Laboratory is a dedicated interactive research space consisting of over 1000 square feet. The initiative aims to strengthen the existing research and development environment of UCSC by providing a conducive research and development. Space will provide students and faculty access to the new instructional research spaces, study areas, mini- library, seminar room, conference room, printing room, common areas and rest areas for students, faculty and community interaction.



STUDENT SERVICES

Library



The main role of the UCSC library is to facilitate a variety of quality and reliable resources that support learning, teaching, and research purposes for both the students and the staff of the UCSC. The Library possesses a rich collection of books, magazines, conference proceedings, theses, and dissertations covering a vast area of disciplines related to Computer Science. Users of the library can fulfill their need for timely access to information relevant to the resources through the online public access catalog of the UCSC library (http://pusthaka.ucsc.cmb.ac.lk/). And also UCSC digital library provides free access to undergraduate and postgraduate dissertations not only for all the students and the staff of the UCSC but also the whole community (http://dl.ucsc.cmb.ac.lk/jspui/).

For further information visit, https://ucsc.cmb.ac.lk/library/

Computing Laboratories



UCSC has eight laboratories with over 250 computers. The username and password to access systems are provided by the Network Operating Centre. Wifi access facilities are provided for the registered students on request.

Network Services

With the view of centralizing the operations of the computer network of the University of Colombo, the Network Operating Centre (NOC) was established in 2002. NOC is located at UCSC and it is the central position, which provides the network connections to all the other faculties and centres in the university. The Internet facility to the university through the LEARN network is also channelled via the NOC. The centre is well equipped with modern networking equipment including servers, switches, routers and test equipment received under the financial assistance of SIDA and ADB. The entire backbone cable system of the campus-wide network is centered at the NOC providing the connectivity to over 2000 users.



Wi-Fi Connectivity

The students are required to submit a completed Wi-Fi connection request form to the NOC during office hours. The request forms can be downloaded from UCSC web site (ucsc.lk/noc). One device per student is registered and the service will be bound to the physical address of the device. The service will be activated by one week of the submission of the request.

The UCSC monitors all user activities according to UGC's policy and guidelines. Students are strongly advised not to engage in unethical or illegal activities using internet connection and computing resources. There is a limited bandwidth allocation for each user.



For further information visit http://ucsc.cmb.ac.lk/noc/

Online Learning Material

Students are provided with a login to the postgraduate virtual learning environment (PGVLE) at the commencement of the programme. Student is required to refer the PGVLE for learning materials, submission of assignments and masters programme related notices etc.

For further information visit http://pgvle.ucsc.cmb.ac.lk/



Canteen Facilities

The UCSC Canteen which is located inside the UCSC building complex is open for the students during the academic semesters from 7.00 a.m. to 6.00 p.m. Canteens of the other faculties are also available for the use of UCSC students.

Photocopy Facility

Photocopy facility is available at the photocopy unit located at the ground floor of the canteen area (East Wing entrance of the UCSC building).



OTHER SERVICES

Audio Visual Recording

An advanced digital studio is equipped with state-of-the- art digital equipment such as digital video cameras, video switcher, editing control unit, audio mixer, lighting system and non-linear editing system. It is one of the best studios in Sri Lanka and is playing a central role in providing distance-learning material.

Video Conferencing Facilities

UCSC possess the state-of-the-art video conferencing equipment.



Auditorium

A new state-of-the-art multipurpose auditorium is available with over 400 seating capacity.

AWARDS AND ACHIEVEMENT

2023

Dr. D A S Atukorale, **Vice Chancellor's Award 2022, University of Colombo, 12th Jan 2024**

Prof. K.P. Hewagamage, **Computing Gold Award 2023, Sliit University**

Prof. K.P. Hewagamage, **National Educator Awards 2023, Sliit University**

Ms. A.L Nanayakkara, **Kingslake Award for the Best Student for the Master of Computer Science, Annual Research Symposium 2023**

Ms. P G M P Gamage, **Best paper award- International Conference on Library & Information Science ICLIS-2023, Sri Lanka Library Association, 27th June 2023**

2022

Prof. K.P. Hewagamage, **Senate Awards for Research Excellence 2020 & 2021 (General Category 2020), Annual Research Symposium 2022.**

Prof. K.P. Hewagamage, **Senate Awards for Research Excellence 2020 & 2021 (General Category 2021), Annual Research Symposium 2022.**

Dr. C.I. Keppitiyagama, **Senate Awards for Research Excellence 2020 & 2021 (General Category 2021), Annual Research Symposium 2022.**

Dr. A.P. Sayakkara, **Senate Awards for Research Excellence 2020 & 2021 (Early Career Category 2021), Annual Research Symposium 2022.**

2020

Halloluwa H K T C, **Executive Dean's Commendation for Outstanding Doctoral Thesis Award** for 2019 at QUT Science and Engineering Faculty, May 2020.

Jayaratne K L, **ICT Researcher of the Year Award for Research Contribution for the year** 2020 at Computer Society of Sri Lanka (CSSL) Information and Communication Technology (ICT) Awards, Colombo, Sri Lanka.

Jayaratne K L, Wickramasinghe M I E, Marasinghe M A P P, and Anjana S, **Gold Award in the Research and Development Category** for "Radio Monitoring System for Royalty Collection from Songs" at National Best Quality ICT Awards (NBQSA 2020) [to select the award winners to honor significant technological developments in the field of Software Technologies in Sri Lanka, British Computer Society, Sri Lanka].

Jayasinghe K P U, **PhD Researcher of the year award** for Biomedical Engineering in 2020, at the University of Reading, UK.

Sayakkara A P, **Best Poster Award** at Digital Forensics Research Workshop (DFRWS EU 2020).

Sayakkara A P, **Best Student Paper Award** at Digital Forensics Research Workshop (DFRWS EU 2020).

Sayakkara A P, **Senate Award for Research Excellence** (Early Career 2019) at the Annual Research Symposium - 2020, University of Colombo.

Weerasinghe A R, Pushpananada B H R, Thilini H N D, **Best Paper Award** at 20th International Conference on Advances in ICT for Emerging Regions (ICTer 2020)

Wijethilake T N B, **Best Oral Presentation Award** at the13th International Research Conference (KDUIRC 2020).

Wijethilake T N B, **Best Paper Award** at the 13th International Research Conference (KDUIRC 2020).

Wimalaratne G D S P, **Senate Award for Research Excellence** (Open Award 2019) at the Annual Research Symposium - 2020, University of Colombo.

2019

Dias G K A, **ICT Educator of the Year** 2019 at CSSL National IT Conference on 8th October 2019.

Hettiarachchi K H E L W, **Best Presentation Award** at the 10th International Conference on Distance Learning and Education (ICDLE for her publication: "Analyzing the Impact of Introducing Active Learning in a Blended Educational Environment".

Sayakkara A P, **Best Student Paper Award** at the DFRWS-USA Special Issue in Elsevier Digital Investigation, for "Leveraging Electromagnetic Side-Channel Analysis for the Investigation of IoT Devices".

Wimalaratne G D S P, **ICT Researcher of the Year** 2019 at CSSL National IT Conference 2019.

Wimalaratne G D S P, **Vice-Chancellor's Award of Research Excellence** at 2018 Postgraduate Convocation of University of Colombo.

2018

"IEEE WIE" Student Branch Affinity Group of UCSC, Best Event Poster at the competition "IEEE WIE" Student Branch Affinity Group of UCSC, Best Event Poster at the competition organized by IEEE Region 10 Women in Engineering

Gunatilake H, Hidellaarachchi D and Perera S, "**Silver Award**", under "Tertiary Student Project (Business)" from National Best Quality ICT Awards (NBQSA) 2018 for a project titled "An ICT based Solution for Virtual Garment Fitting for Online MarketPlace" (The project was supervised by Sandaruwan K. D. and Weerasinghe M was the Adviser).

Kodikara N D, **ICT Educator of the Year** 2018 at CSSL National IT Conference 2018

Karunaratna D D, Sandaruwan K D, Rajapakse R N, Vidanapathirana M, Dharmaratne A T, **Technology Award of Excellence** by National Science Foundation under the Support for Technology Development grant scheme for "Face ID: Computer-Based Forensic Facial Recognition using 3D Graphics" project.

Liyanage H S U, Jayaratne K L and Wickramasinghe M I E, **Merit Award Winner in the e-Health and Well-Being Category** (2018): "An Affordable Solution for Cardiopulmonary Resuscitation Training using Virtual Reality" (Digital Social Impact Awards (e-Swabhimani 2018) to select the award winners to honor significant technological developments of the country's best e-content applications in the category of e-Health and Well-Being, the Ministry of Telecommunications and Information Technology, Sri Lanka)

Liyanage H S U, Jayaratne K L, Munasinghe A and Wickramasinghe M I E, **Winner Award in the e-Learning Category** (2018): "An Affordable Solution for Cardiopulmonary Resuscitation Training using Virtual Reality" at the 3rd Commonwealth Digital Health Awards organized by Commonwealth Medical Association (CMA) and the Health Informatics Society of Sri Lanka (HSSL), Colombo, Sri Lanka.

Mudannayake M A D A L, Weerasinghe T A, won the **1st runner up** for "ICT for Psychosocial Competency Development: A study Conducted in Sri Lanka", at the 3rd Commonwealth Digital Health Awards organized by Commonwealth Medical Association (CMA) and The Health Informatics Society of Sri Lanka (HSSL), Colombo, Sri Lanka.

UCSC team, "Codettes" won the "**Dream Venture – Startups for Women**" organized by IEEE Sri Lanka Section.

2017

Dias G K A, **Vice-Chancellor's Award of Research Excellence** at 2017 Postgraduate Convocation of University of Colombo.

Jayaratne K L, **ICT Researcher of the Year Award** for Research Contribution for the year 2017 at the Computer Society of Sri Lanka (CSSL) Information and Communication Technology (ICT) Awards 2017, Colombo, Sri Lanka.

Kodikara N D, Rosa S R D (Department of Physics), Keppetiyagama C I, Sandaruwan K D, Dias G K A and Senadeera K R (Sri Lanka Navy), **NSF Technology Award of Excellence** was won by the project "COPY Sayura: The three dimensional coastal surveillance system" in 2017.

Pushpananda B H R, Weerasinghe A R and Niranjan M, **Bronze award** in the Postgraduate Student project category at the National Best Quality ICT Awards (NBQSA 2017) for "Improving Performances of Statistical Machine Translation between Sinhala-Tamil Language pair".

Sayakkara A P, Jayasuriya N, Ranathunga T, Suduwella C, Vithanage N, Keppitiyagama C I, Zoysa T N K, Hewage K, Voigt T., **Best paper award** for the project; "Eloc: Locating Wild Elephants using Low-cost Infrasonic Detectors at the Conference on Distributed Computing in Sensor Systems (DCOSS) in 2017 by

Wimalaratne G D S P, **Senate Award for Research Excellence** (Open Award 2017) at the Annual Research Symposium - 2018, University of Colombo

2016

Kodituwakku W H, Hettiarachchi C, Wijesundara D M, **Winner Award** in the Category 'Culture & Tourism' at e-Swabhimani Awards -2016 for the project titled 'Travel Meter': Forecasting Tourist Arrivals to Sri Lanka" (The project was supervised by Dias G K A, Karunarathne D D Thilakaratne C. from the Department of Statistics was the Advisor).

Team "WhileLoop" of UCSC was awarded as the **Champions** of the Janashakthi Full Option Appathon Challenge 2016.

UCSC won **three awards** in three categories "m-Content", "Inclusion & Empowerment", and "Culture & Tourism" at "e-Swabhimani Awards 2016" organized by the ICTA in 2016.

Wimalaratne G D S P, **Presidential Awards for Scientific Publication** at the award ceremony held on 22nd November 2016.

Wimalaratne G D S P, **Senate Award for Research Excellence** (Open Award) 2016 at the Annual Research Symposium - 2018, University of Colombo.

2015

Jayaratne K L, **Research Award** (2015): Awarded in Recognition of Excellence in Research in the year 2015, Postgraduate Convocation of University of Colombo, Colombo, Sri Lanka.

UCSC staff won **Gold and Bronze** at NBQSA e-Health and Education & Training categories for the project Run Tropica (collaboratively done with University of Monash, Malaysia) and K-8 Flight Simulator (collaboratively done with CRD Ministry of Defense).

2014

Modelling and Simulation Group of UCSC, **e-Swabhimani Winner** - "SIYARA Harbour Vessel Traffic Management System", Best e-content applications in the category e-Science and Technology, 2014

Modelling and Simulation Group of UCSC, **Manthan Awards - Winner** - "SIYARA Harbour Vessel Traffic Management System", 2014

Peiris P N, Perera M H, Kumarage M S, Chandana D, **gold award** at e-Swabhimani- 2014 for "SIYARA Harbour Vessel Traffic Management System", Best e-content applications.

Ranasinghe K C, Kumari S C, Kiriella D B and Jayaratne K L , **Winner Award** in the e-Inclusion and Participation Category - (2014): "Swaraloka - Adaptive Music Score Trainer for Visually Impaired in Sri Lanka", (National Best e-Content Award (e-Swabhimani 2014) to select the award winners to honor significant technological developments of the country's best e-content applications in the category of e-Inclusion and Participation by the Ministry of Telecommunications and Information Technology, Sri Lanka).

Ranasinghe K C, Kumari S C, Kiriella D B and Jayaratne K L, **Winner Award** in the e-Inclusion and Accessibility Category - (2014): "Swaraloka - Adaptive Music Score Trainer for Visually Impaired in Sri Lanka" (The Manthan Award South Asia & Asia Pacific 2014 to select the award winners to honor significant technological developments of the Digital Inclusion and Development Applications in the category of e-Inclusion and Participation, New Delhi, India.)

2013

Modelling and Simulation Group of UCSC, **APICTA Award** Certificate of Nomination, Research and Development Category, "SIYARA Harbour Vessel Traffic Management System".

Jayaratne K L, **Research Award** in Recognition of Excellence in Research in the year 2013, Postgraduate Convocation of University of Colombo, Colombo, Sri Lanka.

Ranasinghe K C, Kumari S C, Kiriella D B and Jayaratne K L, **Merit Award in the Tertiary Category** - (2013) for "Swaraloka - Adaptive Music Score Trainer for Visually Impaired in Sri Lanka" (National Best Quality ICT Awards (NBQSA 2013) to select the award winners to honour significant technological developments in the field of Software Technologies in Sri Lanka, British Computer Society, Sri Lanka).

Senevirathna E D N W and Jayaratne K L, **Best Research Paper**: "Automated Content Based Audio Monitoring Approach for Radio Broadcasting", Proceedings of sixth Annual International Conference on Computer Games, Multimedia and Allied Technology (CGAT 2013), Singapore.

Senevirathna E D N W and Jayaratne K L, **Merit Award in the Research and Development Category** for "Content Based Audio Music Monitoring Approach for Sinhala Songs", at National Best Quality ICT Awards (NBQSA 2013) (to select the award winners to honor significant technological developments in the field of Software Technologies in Sri Lanka, British Computer Society. Sri Lanka.)

Modelling and Simulation Group of UCSC, won **two gold awards** for overall performance and for the Research and Development category of the National Best Quality ICT for the "SIYARA harbor VTMS (New Dimension in Port Traffic Management)".

2011

Sandaruwan K D, won **Tillekeratne H, Research Fund Award for Outstanding Postgraduate Research in Information Technology** was presented for his postgraduate research work carried out during 2009-2011.

2010

Modelling and Simulation Group of UCSC, won **Gold Award (Education & Training Category)** at the National Best Quality Software Award (NBQSA)- 2010 for "Vidusayura" Product.

Hettiarachchi K H E L W, **Bronze Award (Education & Training Category)** at the National Best Quality Software Awards (NBQSA) 2010 for "SCORM Based Online Assessment Objects for Computing Skill Evaluation".

Hettiarachchi K H E L W, Mozelius P, Hewagamage K P, Hatakka M, Balasooriya I, Karunarathne D, **Merit Award (Research & Development Category)** at the National Best Quality Software Awards (NBQSA) 2010, "eNOSHA, a Free Open Source Learning Object Repository" for Research Project.

Language Technology Research Laboratory of the UCSC, won **e-Swabhimani 2010 award** for the" Subasa" Project under the e – Inclusion category.

Modelling and Simulation Group of UCSC, **Merit Award** at the International Asia Pacific ICT Alliance (APICTA) Awards 2010 for the "Vidusayura" Project.

Modelling and Simulation Group of UCSC, **Overall Bronze Award** at the National Best Quality Software Award (NBQSA)- 2010 for the "Vidusayura" Project.

UCSC, student project "Nivarana" was awarded the **e-Swabhimani 2010 award** under the e-Health category (At e-Swabhimani 2010, UCSC won in three categories and was also awarded certificates for two other projects).

UCSC, was awarded a **Certificate of Special Merit** for the "Shikshaka" project of the Language Technology Group and a Certificate of Appreciation for the VLE Open Learning.

2009

Modelling and Simulation Group of UCSC, **Best Poster Award (Joint)** for "Virtual Learning and Training Environment for Maritime Education (VLTEME)" at the 27th National Information Technology Conference, September 2009, Colombo, Sri Lanka

Modelling and Simulation Group of UCSC, **Winner** - National Best e-Content Award at e-Swabhimani, Sri Lanka for "Vidusayura" project.

02

Postgraduate Education

POSTGRADUATE EDUCATION

MASTERS PROGRAMMES

The UCSC conducts six different masters programmes to cater towards six distinct categories of postgraduate students.

Master of Computer Science (MCS)

The first ever Computer Science Masters programme in Sri Lanka was launched at the University of Colombo in 1990, while computing was taught at undergraduate level university of Colombo from 1967. The UCSC offered MSc in Computer Science and MSc in Advanced Computing programmes during 2002 to 2004. The new Master of Computer Science programme was launched in 2007 for computing professionals who already possess a degree in computing and wish to acquire a postgraduate qualification in Computer Science. The syllabus of the programme was revised in 2017 in order to be in par with new developments in the computing world. The programme offers 13 mandatory core computing courses. In addition, students are also allowed to follow courses from among a basket of 08 elective subjects. 13 batches of the programmes have graduated as of the year 2023.

Master of Science in Computer Science (MSc in CS)

The Master of Science in Computer Science programme was introduced in 2017 for those who wish to acquire a Computer Science degree with a research focus. Students who registered in the Master of Computer Science programme are provided an opportunity to register in the Master of Science in Computer Science programme based on their academic performance in the first two semesters. The programme includes an advanced research focused dissertation work. The programme offers 14 mandatory core computing courses. In addition, students are also allowed to follow courses from among a basket of 07 elective subjects. 04 batches of the programme have graduated as of the year 2023.

Master of Information Technology (MIT)

The UCSC offered MSc in Information Technology programme during 2002 to 2004. The new Master of Information Technology programme was introduced in 2007 targeting graduates in disciplines other than computing who wish to pursue a career in an Information Technology related area. The syllabus of the programme was revised in 2017 in order to be in par with new developments in the computing world. The programme can also be recommended for those who wish to specialize in a multidisciplinary field. 13 batches of the programmes have graduated as of the year 2023.

Master of Information Security (MIS)

The Master of Information Security programme was introduced in 2012 to cater for the ever evolving cybersecurity needs in defending against a plethora of malicious, fraudulent attacks. The programme consists of fourteen (14) course units with hands-on experience targeted at empowering students via the acquisition of a wide-spectrum of skills and knowledge ranging from an in-depth understanding of the core-cybersecurity theory to the state-of-the-art hands-on practices. 10 batches of the programmes have graduated as of the year 2023.

Master of Business Analytics (MBAnalytics)

The Master of Business Analytics programme launched in 2018. The programme has been designed to produce graduate students in the fields of data science and business analytics. The programme mainly targets to cater for the burgeoning requirement for data scientists in the industries locally as well as globally. 02 batch of the program has graduated as of year 2023.

Master of Cybersecurity (MCyberSec)

Master of Cybersecurity is a distance International Master Program in Cybersecurity launched in 2018 in collaboration with Asi@Connect TEIN Cooperation Centre and European Commission. The programme covers a broad spectrum of subjects in Network Security and Cybercrime Investigation. Main objective of the programme is to produce graduates who are competent in Cybersecurity related theory and practice with working knowledge to protect IT infrastructures in their organizations. The programme administers online (distance learning) and the students are required to be present at the UCSC for hands-on practical sessions and for the semester examinations. The 1st batch was graduated in 2022.

RESEARCH DEGREE PROGRAMMES

UCSC offers the following research degree programmes in the field of computing.

1. Master of Philosophy in Computing (Full time/Part Time)
2. Doctor of Philosophy in Computing (Full time/Part Time)

The programmes aim to promote high- quality computing research from within the University system to enhance its research visibility and to promote collaborations with foreign research scientists as well as with the industry. The PhD is a minimum three-year (or five year, if taken part-time) degree resulting in a substantial thesis. The first year of the PhD degree programme, shall be full-time for all the students.

The MPhil is a minimum two-year (or three year, if taken part-time) degree resulting in a substantial thesis. UCSC is keen to receive applications from potential research students in subdomains of computing research. Potential applicants are encouraged to explore the research groups and academic staff member profiles on UCSC web to identify a suitable topic or potential supervisor. Alternatively, candidates can identify a possible PhD project from the projects published on UCSC web when such opportunities are available. Further details are available on the Postgraduate Research HandBook available on UCSC web.

NEW MASTERS PROGRAMMES

The UCSC plans to introduce the following master programme in 2024.

Master of Computing Research (one year programme)

The programme aims to promote high-quality research from within the state University system to enhance its research visibility and to promote research collaborations with foreign higher learning institutes. The programme aims to attract freshly passing out computing graduates with good research skills who plan to pursue doctoral studies overseas or seek R&D employment opportunities in the industry.

For further details on postgraduate degree programmes by research, visit the UCSC website: www.ucsc.cmb.ac.lk/pg

03

Research @ UCSC

INTRODUCTION

The University of Colombo School of Computing offers the following research degrees;

1. Doctor of Philosophy in Computing (PhD)
2. Master of Philosophy in Computing (MPhil)

With the establishment of the University of Colombo School of Computing (UCSC) in 2002 as the first centre of higher learning of computing in Sri Lanka, research postgraduate degrees leading to Master of Philosophy(MPhil) and Doctor of Philosophy(PhD) programmes as well as taught masters programmes in Computer Science, Information Technology and Advanced Computing were launched. The UCSC awarded its first MPhil in 2008 and the first PhD awarded in 2014 as a split-site PhD programme at the UCSC, and Uppsala University, Sweden. The split PhD programme was offered in collaboration with the Swedish International Development and Corporation Agency (SIDA).

UCSC has over 30 PhDs and 05 MPhils who have qualified at leading universities in Canada, USA, UK, Japan, and Australia etc. The USCS has a rich resource pool of academic expertise in a multitude of computing research domains such as Database Management, Machine Learning, Natural Language Processing, Computer Graphics and Simulation, eLearning, Machine Vision, Bioinformatics etc.

UCSC plans to inaugurally open its State-of-the-art research facility UCSC Research Laboratory in 2021. The Laboratory is a dedicated interactive research space consisting of over 1000 square feet. The initiative aims to strengthen the existing research and development environment of UCSC by providing a conducive research and development. The construction of the new research laboratory began by the end of 2019 completed 2021. Space will provide students and faculty access to the new instructional research spaces, study areas, mini-library, seminar room, conference room, printing room, common areas and rest areas for students, faculty and community interaction. Students with outstanding academic careers are encouraged to apply for research degrees. The applications are entertained throughout the year for MPhil, and PhD.

For further details please contact the Postgraduate division on +9411-2581245/7 Ext. 8994 or email researchpg@ucsc.cmb.ac.lk

MASTER OF PHILOSOPHY IN COMPUTING (MPHIL)

DURATION

According to Degree of Master of Philosophy in Computing By-Laws No 27. of 2023.W

Full Time - Minimum - 2 Years/ Maximum - 4 Years
Part Time - Minimum - 3 Years/ Maximum - 6 Years

ELIGIBILITY FOR ADMISSION

a) i) A Master's Degree in Computing from a University or an Institution recognized bythe UGC; OR

An Honours Degree in Computing with First or Second Class from a University or an Institution recognized by the UGC; OR

Any other Honours Degree in Mathematics, Statistics, Physics, Electrical Engineering, Electronics Engineering, and Telecommunication Engineering disciplines with First or Second Class from a University or an Institution recognized by the UGC and any other qualifications deemed equivalent by the Board of Study for Research and Higher Degrees of the School (hereinafter referred to as the Board) of the School on a case-by-case. AND

ii) A pass in the Postgraduate Qualifying Test set by the School, AND

iii) A Pass in Proposal Defense.

b) A student who has already been registered for the Ph.D. Degree Programme in the School shall be permitted to downgrade his/her registration for the MPhil Degree Programme by satisfying the procedures and requirements as prescribed by these By-Laws and/or any other relevant By-Laws and/or Regulations and/or Rules.

DOCTOR OF PHILOSOPHY IN COMPUTING (PHD)

DURATION

According to Doctor of Philosophy in Computing By-Laws No 28 of 2023.

Full Time - Minimum - 3 Years/ Maximum - 7 Years
Part Time - Minimum - 4 Years/ Maximum - 8 Years

ELIGIBILITY FOR ADMISSION

a) i) An MPhil Degree in Computing from a University or an Institution recognized by the UGC; OR
A Master-by-Research Degree with at least 30 Credits of research work in Computing from a University or an Institution recognized by the UGC; AND

ii) A pass in the Postgraduate Qualifying Test set by the School, AND

iii) A pass in Proposal Defense.

b) A student who has already been registered for the MPhil Degree Programme in the School shall be permitted to upgrade his/her registration for the Ph.D. Degree Programme by satisfying the procedures and requirements as prescribed by these By-Laws and/or any other relevant By-Laws, and/or Regulations and/or Rules.

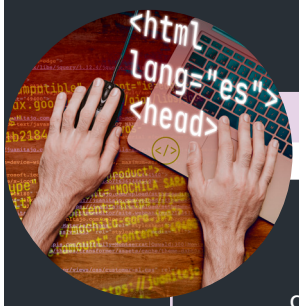
***The first year of the Degree Programme, after the successful completion of the Formal Research Proposal Defense, shall be full-time for all the students. After the first year of study, students may have the option of continuing to be a full-time student or becoming a part-time student*

RESEARCH GROUPS @ UCSC

Research and innovations lie at the heart of success in a University. As the pioneer in Computer Science education in the country, UCSC has already identified the potential we have to help solve the real-world problems through technology partnerships and collaborations. Our culture of collaboration encourages innovative discoveries in areas vital to the betterment of the world.

Eleven independent research groups are working on diverse areas witnessing the importance of interdisciplinary research because we have identified it is at the intersection of disciplines where new ideas emerge, and innovative research happens. Our labs are enriched with academicians and students from undergraduate, masters' and doctoral studies.

All members of the UCSC community are encouraged to create new knowledge through inventive insights and solutions.



LANGUAGE TECHNOLOGY RESEARCH LABORATORY (LTRL) RESEARCH GROUP

Dr. B. H. R. Pushpananda

This research group support the United Nations sustainable development goals of 04 (quality education), 05 (Gender Equality) and 08 (Decent work and economic growth)

Language Technology Research Laboratory (LTRL) was established in 2004 to address the growing need for local language computing in Sri Lanka by conducting Localization and Language Processing research and development. LTRL maintains strong relationships with all related parties, collaborating with the researchers, practitioners, linguists and policymakers in the island. The research group has a diverse range of activities: Research & Development, Consultancy, Training and Services. LTRL conducts research in the field of computational linguistics: phonetics/phonology, morphology, and syntax of local languages. These researches are mainly focused on mathematical and statistical modeling of local languages, namely Sinhala and Tamil. These research programs are strengthened by the supervision and consultation of a panel of senior scholars from various linguistic traditions.

Projects :
- Developing Sandhi Splitting and a Parallel Corpus for Sinhala and Sri Lanka Tamil Languages
- Developing Sandhi Splitting and LTRL and Subasa Website Development

More Details: https://ucsc.cmb.ac.lk/ltrl/



USEHCI RESEARCH PROJECT

Dr. H K T C Halloluwa

This research group support the United Nations sustainable development goals of 01 (No Poverty) and 04 (quality education)

This research study aims to explore the concept of Multiple Intelligence Theory through a technological approach using emerging technology which is specialized in Explainable AI (XAI). The proposed solution will develop an AI model to classify the abilities of students based on MI theory while identifying the most prominent types of intelligence possessed by the participants of the test.

Projects
- Higher Education for all Project: An Explainable AI driven Methodology for detecting Multiple Intelligence

More Details: https://ucsc.cmb.ac.lk/research/



ECLOUDML RESEARCH GROUP

Dr. M G D K Fernando

This research group support the United Nations sustainable development goals of 04 (quality education) and 08 (Decent work and economic growth)

Area of research cover proposing an early dropout prediction model using machine learning techniques and discuss the interpretability of the proposing model

Projects
- Drop out prediction of students learning under fully online and blended learning environment
- Timely Virtual Machine Failure Prediction using Log Analysis for Proactive Fault Tolerance

More Details: https://ucsc.cmb.ac.lk/research/



COTS RESEARCH GROUP

Dr. M I E Wickramasinghe

This research group support the United Nations sustainable development goals of 09 (Industry, Innovation and Infrastructure) and 16 (Peace, Justice and Strong Institutions Peace, Justice and Strong Institutions)

Projects
- Framework for Emotion Recognition : An EEG Based Classification on Music Listening
- Audio Monitoring and Remastery Detection using Time Series Techniques

More Details: https://ucsc.cmb.ac.lk/research/



C4SA (SUSTAINABLE AGRICULTURE) RESEARCH GROUP

Dr. L N C De Silva

This research group support the United Nations sustainable development goals of 02 (Zero Hunger) and 09 (Industry, Innovation and Infrastructure)

This research proposes to design and develop an Android application that simplifies the management of indoor hydroponic systems using IoT technology. The application aims to optimize various parameters involved in hydroponic systems and streamline the process for users. The outcomes of this research have the potential to revolutionize the management of hydroponic systems and contribute the sustainable agriculture practices

Projects
- Developing a Pests and Diseases Detection Support Chatbot for Paddy Cultivation Management
- Hydroponics Device Version 2 - Detail Time line is attached herewith
- Hydroponics Device User Evaluation Agri Chatbot Dataset creation/ domain knowledge

More Details: https://ucsc.cmb.ac.lk/research/



SYNERGY RESEARCH GROUP

Mr. R J Amaraweera

This research group support the United Nations sustainable development goals of 01 (No Poverty), 04 (quality education), 05 (Gender Equality), 10 (Reduced Inequalities)

Projects
- Velocity - A Gamified learning tool to enhance Grade five students' Mathematics skills
- Exploring the possibility of using a thermal camera to analyze learners' attention

More Details: https://ucsc.cmb.ac.lk/research/



AGROTECH RESEARCH GROUP

Prof. K P Hewagamage

This research group support the United Nations sustainable development goalsof

12 (Responsible Consumption and Production)

Projects
- Smart Agro: Using Aerial imagery to help farmers make better decisions on nitrogen requirements in paddy Farms

More Details: https://ucsc.cmb.ac.lk/research/



MODELING AND SIMULATION (SIM) RESEARCH GROUP

Dr. K D Sandaruwan

This research group support the United Nations sustainable development goals of 04 (quality education), 08 (Decent Work and Economic Growth) and 09 (Industry, Innovation and Infrastructure)

The modeling and simulation group of UCSC was initially formed in 2008 to work on a Ship Handling Simulator (ViduSayura) for the Sri Lankan Navy. This was a collaborative research effort involving personnel from the UCSC, Department of Physics of the University of Colombo, and the Sri Lankan Navy. Currently, the modeling and simulation group of UCSC collaboratively carries out various researches and development activities with national and international organizations.

Projects
- Enhancing User Experience in Web-Based AR/VR Applications through Dynamic Content Integration and Extending Available Interaction Techniques: Exploring Metaverse Trends

More Details: https://ucsc.cmb.ac.lk/simulation/



GEOMATICS - GIS RESEARCH GROUP

Dr. K H E L W Hettiarachchi

This research group support the United Nations sustainable development goals of 02 (Zero Hunger), 09 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities), 12 (Responsible Consumption and Production), 15 (Life on Land) and 17 (Partnerships for the Goals)

The main aim of this project is to utilize drone imagery to estimate the extent of land occupied by various types of plantations in Sri Lanka. This will be achieved by devolving a system that can analyze the drone images and classify areas with similar types of cultivation, aiming to determine the coverage areas of different plantations accurately.

Projects
- Estimate land coverage utilized for plantations by using drone images

More Details: https://ucsc.cmb.ac.lk/research/



MIXEDREALITY RESEARCH GROUP

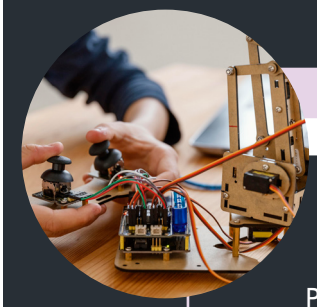
Dr. K T K T Karunanayake

This research group support the United Nations sustainable development goals of 04 (quality education), 10 (Reduced Inequalities), 11 (Sustainable Cities and Communities)

Explore the potential of using mixed reality technology technologies on enhancing the lives of elderly and visually impaired community. Which means. Developing algorithms that can analyze data from sensors in the AR device and make real – time adjustments to the display or output based on the user's movements and actions. This could help improve the overall user experience and increase the effectiveness of their day – today – activates.

Projects
- Improving the Quality of Life of Elderly and Visual Impaired using Mixed Reality (MR)

More Details: https://ucsc.cmb.ac.lk/research/



MINDSYS - MIND SYSTEMS RESEARCH GROUP

Dr. H E M H B Ekanayake

This research group support the United Nations sustainable development goals of 03 (Good Health and Well-Being)

Projects
- Development and Evaluation of a Research Grade Electric Buzz Wire (EBW) Game

More Details: https://ucsc.cmb.ac.lk/research/



MLDAG RSEARCH GROUP

Mr. G P Seneviratne

This research group support the United Nations sustainable development goals of 01 (No Poverty), 02 (Zero Hunger), 03 (Good Health and Well-Being), 08 (Decent Work and Economic Growth), 09 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production)

Projects
- A configurable grading platform for fruits using ML

More Details: https://ucsc.cmb.ac.lk/research/



SYSRES - SYSTEM RESEARCH GROUP

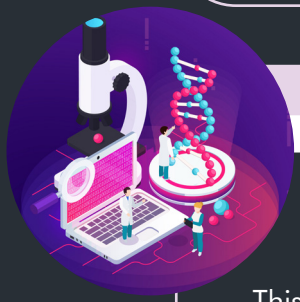
Dr. D A S Atukorale

This research group support the United Nations sustainable development goals of 09 (Industry, Innovation and Infrastructure)

The proposed message app aims to provide a secure and anonymous communication platform for university members, encouraging open dialogue and feedback. The emphasis on decentralized architecture, anonymous communication, and robust security measures will set it apart from traditional messaging apps. DEHATI empowers individuals to express their opinions freely and contribute to a more informed and inclusive community.

Projects
- Discardable Encrypted Host-based Application-level Tunneling Infrastructure (DEHATI)

More Details: https://ucsc.cmb.ac.lk/research/



BIOSYS RESEARCH GROUP

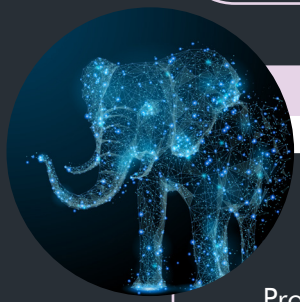
Ms. M W A C R Wijesinghe

This research group support the United Nations sustainable development goals of 03 (Good Health and Well-Being)

This research proposes an integrated approach to thalassemia screening, combining deep learning algorithms with blood image analysis and red blood cell indices. The proposed automated system addresses current limitations in accuracy, efficiency, and accessibility, offering a transformative solution for regions with a high prevalence of thalassemia and low resources. The scalability of the developed models holds promise for global impact, ushering more effective, cost-efficient, and inclusive thalassemia screening that aligns with broader healthcare goals

Projects
- Integrative Network analysis to identify drug candidates for Alzheimer's disease
- Screening Blood Images and Red Blood Cell Indices of Thalassemia using Deep learning techniques

More Details: https://ucsc.cmb.ac.lk/research/



ELEPIDYNAMICS RESEARCH GROUP

Dr. P V K G Gunawaedana

This research group support the United Nations sustainable development goals of 15 (Life on Land)

Projects
- Individual Elephant Identification Using A Combination Of PhysicalTraits: A Deep Learning Approach

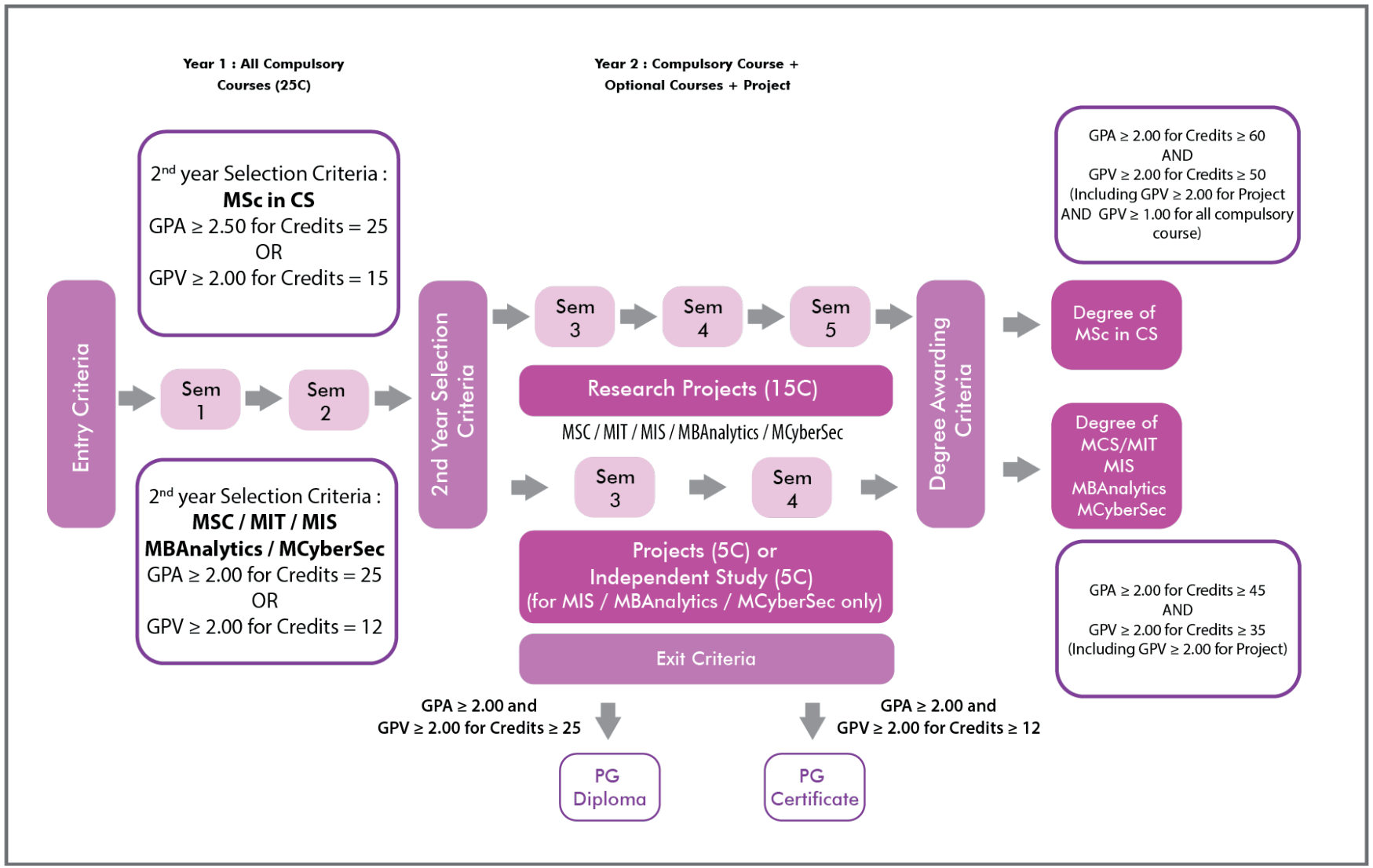
More Details : https://ucsc.cmb.ac.lk/research/

04

Taught Masters @ UCSC

Main Stages of the Masters Degree Programmes

Duration: 2 - 4 Years for MCS/ MIT/ MIS/ MBAnalytics/ MCyberSec
Duration: 2 ½ - 5 Years for MSc in CS



4.1

Master of Computer Science

Master of Science in Computer Science

DURATION

MCS: Two academic years, part-time, consists of four semesters (up to 15 weeks per semester).

MSc in CS: Two and half academic years, part-time, consists of five semesters (up to 15 weeks per semester)

LECTURES

Lectures and practicals will be conducted according to the time table.

ENTRY QUALIFICATIONS

a) A Bachelors Degree in Computing from a University or Institution recognized by the University Grants Commission and/or the University of Colombo **Or**

b) Any other academic or professional qualification deemed equivalent to a Bachelors Degree in Computing by the Senate of the University of Colombo

ADMISSION

The selection process consists of a written test followed by an interview.

CREDIT REQUIREMENTS

Course/Subject Description	Credit Value	Direct Staff-Student Contact Hours	Notional Hours (direct staff-student contact hours and independent learning)
Lecture course	1	15	50
Laboratory course	1	30	50
Individual project	5	variable	500
Individual Research	15	variable	1500

One credit is considered equivalent to 50 notional learning hours for a taught course and laboratory course. In the case of project work/ Independent Studies, one credit is considered equivalent to a minimum of 100 notional hours.

PROGRAMME STRUCTURE

The programme has a number of courses and each course will carry a specified number of credits. Module descriptors for each course are available on VLE.

First and second semesters consist of compulsory courses while the third and fourth semesters consist of both compulsory and optional courses.

SEMESTER 1

Following core/ compulsory course units shall be offered in semester 1.

MCS1201 - Advanced Algorithms

3 Credits

Asymptotic Analysis of Algorithms: Time Complexity, Order of growth, Tractable and Intractable Problems, Solving Recurrences; String Matching Algorithms: Naïve String Matching, Boyer-Moore String Matching, KMP Algorithms, Rabin-Karp Algorithm; Dynamic Programming and Greedy Strategy, Graph Algorithms: Shortest Path Algorithms, Minimum Vertex Cover Problems, Minimum Spanning Trees; Randomized Algorithms: Monte Carlo Algorithms, Las Vegas Algorithms.

MCS1202 - Advanced Software Engineering

3 Credits

Challenges in Software Engineering, Evolution of Software Development Models, Software Requirement Engineering and Management, Industry Practices in Unified Process Models, Object-Oriented Modelling & Frameworks, Software Architecture and Refactoring, Design Patterns and Application, Software Reuse and Component-based Software Engineering, Code Quality and Code Summarization, Empirical Software Engineering, Open Source Software Engineering, Social Software Engineering, Agile Practices and Culture, Code Analyzer, Code Clone Analyzer, Static and Dynamic Code Analyzer, Emerging Trends.

MCS1203 - Advanced Database Systems

3 Credits

Database Integrity, Transaction Management and Recovery, Concurrency, Distributed Databases, Query Processing and Optimistic Databases, Emerging Technologies: Data Warehousing, XML and Internet Databases, Object-Relational Databases, Emerging Trends

MCS1204 - Selected Topics in Computer Science

2 Credits

Logic, Information Theory Concepts, Zero-Knowledge Interactive Proofs, Game Theory, Social Network Dynamics, Concurrent Process Algebras, Quantum Computing, Geometric Computation, Image Security, Biological Computing, Combinatory, Secure Software Development, Adaptive Gaming, Cryptocurrency, Dark Web, Emerging Trends

MCS1205 - Principles of Programming Languages

3 Credits

Introduction, Evaluation Criteria for Languages, Language Implementation Methods, Syntax and Semantics, Lexical and Syntax Analysis, Data Types, Names, Bindings, Type Checking and Scope, Language Expressions and Assignments, Control Statements, Subprograms, Object Orientation Support in Languages, Exceptions and Event Handling, Introduction to Lambda Calculus, Functional Programming Language Fundamentals, Emerging Trends.

SEMESTER 2

Following core/ compulsory course units shall be offered in semester 2.

MCS2201 - Information Systems Security

3 Credits

Introduction to Information Security & Cryptography, Hash Algorithms, Secret Key (Symmetric) Encryption Systems, Properties of Arithmetic Operations, Public Key (Asymmetric key) Encryption Systems, Key Management Protocols, Java Cryptography, Network Security, Web Security, Secure Electronic Mail, Operating Systems Security, Database Security, Program Security, Legal Issues, Emerging Trends.

MCS2202 - Advanced Concepts in Data Communications Networks

3 Credits

Introduction, Channel Characterization, TCP/IP Stack, IP Addressing, IP Support Protocols; Multi-access Protocols: Static and Dynamic Channel Allocation, CSMA, CSMA/CA, CSMA/CD, FDMA and TDMA; Routing: IPv6, OSPF, RIP, BGP, MPLS, Multicast (DVMRP, etc.), key-based (DHT); End to End Issues: TCP and Congestion Control and QoS; Data Centre Design and Virtualization, SDN Concepts; CDMA, MANETS, IoT, Vehicular Ad Hoc Nets; Network Simulation (NS, Mininet), Emerging Trends.

MCS2203 - Data Analytics & Machine Learning

3 Credits

Data Mining: Introduction to Data Mining, Knowledge Extraction Process, Data Pre-processing, Frequent Itemsets Mining, Association Rule Mining, Classification and Cluster Analysis, BI Tools and Application, Overview of Big Data Analytics; Data Warehousing: Introduction to Data Warehouse, Data Warehouse Architecture, Multidimensional Data Model, Concept Hierarchies, Attributes Generalization and Relevance, Online Analytical Process, Business Intelligence (Tools and Visualization); Machine Learning: Supervised Learning, Unsupervised Learning, Ensemble methods, Overview of Deep learning, Natural Algorithm and Reinforcement Learning, Emerging Trends.

MCS2204 - Theoretical Computing

2 Credits

Mathematical Preliminaries, Strings and Languages, Recursive Definition of Sets, Finite Specification of Languages, Regular Sets, Regular Expressions, Deterministic Finite State Automata (DFA), Nondeterministic Finite State Automata (NFA), Construction of Equivalent DFA of a Given NFA, Equivalence of DFA, NFA, and Regular Expressions, Closure Properties of Regular Languages, Myhill - Nerode Theorem as Characterization of Regular Languages, and States Minimization of DFA, Context-Free Grammars (CFG) and Languages Generated, Regular Grammar, and Equivalence of Regular Grammar and Finite State Automata, Ambiguity of CFG and Normal forms of CFG, Pushdown Automata (PDA) and its variations, Turing Machines, Generalized Versions of Turing Machines, Decidability and Recognizability, Decision Problems and the Church – Turing Thesis, Encoding of Turing Machines and the Halting Problem for Turing Machines, Universal Turing Machine, Reducibility, Rice's Theorem; Decidability of Membership, Emptiness, and Equivalence Problems of Languages.

SEMESTER 3

Following core/ compulsory course units shall be offered in semester 3.

MCS3201 - Intelligent Systems

3 Credits

Philosophy of AI, Search (Heuristic/Adversarial/Informed/Uninformed Search), Knowledge Representation and Reasoning, CommonKADs, Planning, Learning, Introduction to NLP and Linguistics, Intelligent Agents, Semantic Web, Emerging Trends.

MCS3202 - Systems Modelling & Simulation

3 Credits

Deterministic Systems: Difference and Differential Equation and Their Numerical Solutions, Stochastic Systems: Probability Distributions, Random Variables, Markov Chains, Monte Carlo Simulation, Discrete-Time vs. Discrete Event Simulation, Cellular Automata, and System Simulation Tool.

MCS3203 - Individual Research

15 Credits

This course unit aims to enhance the capacity of candidates to advance their knowledge, investigative skills and other skills to explore new knowledge within the field of computer science which in turn form the basis for academic advancement and technological development. A candidate specializes in an area within the field of computer science and hence, should demonstrate a critical awareness of current issues and recent developments within the area of specialization. This course requires a high level of theoretical engagement, critical analysis and evaluation with respect to the research work carry out. The major expectations of this course unit are: conduct a comprehensive research work in the field of computer science with a substantial research contribution; construct hypotheses in the area of specialization and test them in a scientific manner; conduct a relevant background study with a critical analysis of related scientific work and evaluate current research in the area of specialization to clearly demonstrate the awareness of the broader context of the problem; formalize arguments logically and, employ these arguments to make sound judgements and to conclude a research solution scientifically; conduct a critical evaluation of the research which clearly demonstrates the technical quality and research merit; by following proper academic writing standards, submit a dissertation and a research paper based on the research outcome which is evaluated and accepted; demonstrate the work at the oral examination.

**Students are required to initiate the individual project activities by the 9th week of their 2nd semester in order to provide sufficient time for students to prepare a proper project proposal prior to the start of the semester. As per the guidance of the Coordinator of the Individual project, you will be assigned to prepare the draft preliminary project proposal, select a supervisor, and get feedback from the supervisor for the draft proposal during this stage.*

MCS3204 - Individual Project

5 Credits

The aim of this course unit is to enhance the intellectual capacity of candidates to advance their knowledge and investigative skills, and other abilities relevant to computer science, forming the basis for academic advancement and technological capacity. This includes the development of an innovative software application with a research component. The major expectations of this course unit are: conduct a relevant background study with a critical analysis of similar systems and applications to clearly demonstrate a comprehensive level of knowledge and understandability of the broader context of the problem; critically analyze data, make judgments to evaluate the system to clearly demonstrate the technical quality and innovativeness; demonstrate the findings in a dissertation which will be evaluated and accepted; demonstrate the work at the oral examination.

**Students are required to initiate the individual project activities by the 9th week of their 2nd semester in order to provide sufficient time for students to prepare a proper project proposal prior to the start of the semester. As per the guidance of the Coordinator of the Individual project, you will be assigned to prepare the draft preliminary project proposal, select a supervisor, and get feedback from the supervisor for the draft proposal during this stage.*

In the third semester of the Programme, the following optional courses shall be offered:

MCS3205 - Distributed Systems

3 Credits

Fundamental Concepts: Objectives, Evolution, Abstractions, Overview, Coordination, Agreement and Fault Tolerance: Leader Election, Consensus, BFT, Blockchain as Ledger Consensus, Atomic Commit, Time and Broadcast: Logical Clocks, Vector Clocks, Ordering and Reliability, RBCAST, URBCAST, ABCAST, Specialized Middleware: Cassandra, Zookeeper, Spanner, Streaming Pub/Sub, Parallel Computing: SIMD and MIMD architectures, Amdhal's Law, MPI, OpenMP, GPU Computing, Emerging Trends.

MCS3206 - Advanced Computer Graphics and Gaming

3 Credits

Graphics Rendering Pipeline, CUDA Programming, Graphics Primitives, Fundamentals of Transformations, Quaternions, Bezier Curves and NURBS, Texture Mapping, Rendering Techniques, Introduction to Physically based Modelling, Illumination Models, Introduction to Fundamentals of Game Engines, Game Design Fundamentals, Collision Detection and Response, Game AI.

MCS3207 - Bioinformatics

2 Credits

Introduction to Bioinformatics: Bioinformatics, Applications and Challenges, Types of Biological data – DNA, RNA, Amino Acid and Protein, Molecular Biology: Central Dogma, Archives and Information Retrieval, Genome Organization and Evolution, Sequence Alignment, Phylogeny: Phylogenetics Basics, Multiple Sequence Alignment, Gene Expression and Regulation, Structural Bioinformatics and Drug Discovery, Systems Biology: Metabolic Pathways, Dynamics of Metabolic Pathways.

MCS3208 - Research Methods

2 Credits

Science, Scientific Method, and Research; Research Philosophies, e.g. Positivism, Subjectivism, Interpretivism, Pragmatism, Critical Realism; Approaches to Theory Development: Induction, Deduction, Abduction; Types of Research and Selecting/ Defining a Research Problem, Defining Research Aims, Questions and Objectives; Conducting a Literature Review, Referencing & Referencing Styles, Research Onion; Research Strategies: Experiments, Case Studies, Action Research, Survey, Ethnography; Method Choices; Time Horizons; Credibility of Findings; Research Ethics and Integrity; Publishing.

SEMESTER 4

Following core/ compulsory course units shall be offered in semester 4.

MCS4201 - Cognitive Systems

2 Credits

Introduction to Affective, Behavioral, and Cognitive (ABC) Systems; ACT-R Cognitive Architecture: Introduction to Production Systems, ACT-R Theory, ACT-R Programming Environment and Lisp, Selected Examples; Dynamic Field Theory (DFT): Foundations of DFT, Selected Examples; Cognitive Robotics: Biological Foundations and Emergent Behaviors, Representative Architectures and Behavioral Programming, Embodied Robotics; Affective Computing: Emotion and Psychophysiological Signals, Emotion Sensing and Recognition, Emotion Modeling; Brain-Computer Interface (BCI): Signal Acquisition and Processing, Applications, Emerging Trends.

MCS4202 - Embedded Systems

2 Credits

Introduction to Embedded Systems, HDLs and FPGA Design Flow, PIC MCU Programming in Assembly/C, Arduino Programming, Embedded Communication Protocols; Digital Signal Processing (DSP): Introduction to DSP, DSP Filters and Analysis, DSP Controllers and Applications in Embedded Systems; Wireless Sensor Networks (WSN): Introduction to WSN, WSN MAC Layer, WSN Routing Protocols, WSN Operating Systems, WSN Localization; Special Topics: Embedded Systems Modeling, Embedded Systems Verification and Human Factors, Emerging Trends

Following optional course units shall be offered in semester 4.

MCS4203 - Image Processing and Vision

2 Credits

Image Characterization: Introduction to Image Processing and Computer Vision, Digital Image Representation, Color Theory; Spatial Domain Image Processing: Transformation and Histogram based Techniques, Filter based Techniques; Frequency Domain Image Processing: Frequency Domain Techniques; Special Topics in Image Processing: Image Restoration, Edge and Line Detection; Computer Vision: Image Segmentation, 3D reconstruction, Recognition, Computational Photography.

MCS4204 - Software Project Management and Quality Assurance

3 Credits

Introduction, Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Communications Management, Human Resource Management, Procurement Management, Risk Management, Financial Calculations for Project Appraisals, Software Quality Assurance.

MCS4205 - Natural Algorithms

2 Credits

Introduction; Sorting, Shortest Path, Travelling Salesman Problem; Evolutionary Computing: Genetic Algorithms (GA), Genetic Programming (GP), Genetic Based Machine Learning (GBML); Swarm Intelligence: Particle Swarm Optimization (PSO); Foraging Algorithms: Ant Colony Optimization (ACO), Bees Algorithm (BA), Cockroach Algorithm (CA); Artificial Immune Systems (AIS), Emerging Trends.

MCS4206 - Mobile Computing

3 Credits

Introduction, Operating Systems for Wireless Mobile Devices, Mobile Development Environment (Android), Anatomy of an Mobile App and the App Lifecycle, Mobile Development, Applications Development for Mobile Devices with Android Studio, Android User Interface, Android Intents & Android Persistence, Android WebView and Web Services, 2D Graphics, Location-based Apps, Sensing and Sensors, Hybrid Mobile App Development (Ionic), Native Mobile App Development (React Native), Mobile Testing, Mobile Security (Bouncy Castle, Spongycastle), Emerging Trends.

MCS4207 - Enterprise Web Architecture

2 Credits

Introduction to Enterprise Web Architecture, Scale-Free Networks, Hubs, TCP/IP, HTTP, Request-Response Model, Client-Server model, Peer-to-Peer Computing, Service Oriented Architecture (SOA), XML, SOAP, Web Services, Design Patterns, Web Application Architectures, Web Application Architectural Patterns, Enterprise Integration, Enterprise Application Integration (EAI) Models, Enterprise Integration Patterns, Data/ Information Architecture, Data Integration, Migrating Legacy Systems to the Web-Based Model, Software Engineering Methodologies for Enterprise Web Applications, Emerging Technologies in Web Application Architecture.

SEMESTER 5

Following compulsory course of the Master of Science in Computer Science shall be continued in semester 5.

MCS3203 - Individual Research

15 Credits

This course unit aims to enhance the capacity of candidates to advance their knowledge, investigative skills and other skills to explore new knowledge within the field of computer science which in turn form the basis for academic advancement and technological development. A candidate specializes in an area within the field of computer science and hence, should demonstrate a critical awareness of current issues and recent developments within the area of specialization. This course requires a high level of theoretical engagement, critical analysis and evaluation with respect to the research work carry out. The major expectations of this course unit are: conduct a comprehensive research work in the field of computer science with a substantial research contribution; construct hypotheses in the area of specialization and test them in a scientific manner; conduct a relevant background study with a critical analysis of related scientific work and evaluate current research in the area of specialization to clearly demonstrate the awareness of the broader context of the problem; formalize arguments logically and, employ these arguments to make sound judgements and to conclude a research solution scientifically; conduct a critical evaluation of the research which clearly demonstrates the technical quality and research merit; by following proper academic writing standards, submit a dissertation and a research paper based on the research outcome which is evaluated and accepted; demonstrate the work at the oral examination.

The syllabus applicable to each course shall be prescribed by the school from time to time and as approved by the Academic Syndicate.

4.2

Master of Information Technology

DURATION

Two academic years, part-time, consists of four semesters (up to 15 weeks per semester).

LECTURES

Lectures and practicals will be conducted according to the time table.

CREDIT REQUIREMENTS

a) A Bachelors Degree from a University or Institution recognized by the University Grants Commission and/or the University of Colombo **Or**

b) Any other academic or professional qualification deemed equivalent to a Bachelors Degree by the Senate of the University of Colombo

ADMISSION

The selection process consists of a written test followed by an interview.

CREDIT REQUIREMENTS

Course/Subject Description	Credit Value	Direct Staff-Student Contact Hours	Notional Hours (direct staff-student contact hours and independent learning)
Lecture course	1	15	50
Laboratory course	1	30	50
Individual project	5	variable	500

One credit is considered equivalent to 50 notional learning hours for a taught course and laboratory course. In the case of project work/ Independent Studies, one credit is considered equivalent to a minimum of 100 notional hours.

PROGRAMME STRUCTURE

The programme has a number of courses and each course will carry a specified number of credits. Module descriptors for each course are available on VLE.

First and second semesters consist of compulsory courses while the third and fourth semesters consist of both compulsory and optional courses.

SEMESTER 1

Following core/ compulsory course units shall be offered in semester 1.

MIT1201 - Program Design and Programming

3 Credits

Basic Syntax and Semantics of Higher Level Programming Languages; Control Structures and Related Problem Solving Activities; Functions and Parameter Passing, Structured Programming Concepts and Recursive Problem Solving; Primitive Data Types, Arrays, Records, Tuples, Dictionaries, etc. and Basic String and String Processing, Design, Implementation, Testing and Debugging; Data Representation in Memory, Pointer-Based and Reference Based Implementation, Linked List Data Structures and Application; Hash Functions, Stack and Queue Applications; Graphs and Trees Traversals Techniques and Applications; Sorting Algorithm Families and their Running Times, Advanced Sorting Algorithms, Searching Algorithms, Time Complexity.

MIT1202 - Computer Systems

3 Credits

Data Representation – Numbering Systems, Positive / Negative Number Representation, Floating Point Number Representation; Logic Operations - Basic Logic Operators and Logic Gates, Basic Logic Circuit Design, Combinational Logic, Sequential Logic; Inner Workings of the CPU- Components of a CPU, Specifications, Instruction Set Architecture, Fetch and Execution Cycle; Memory Components and Organization - Types of Memory, Memory Hierarchy, Cache Memory and Mapping Schemes, Virtual Memory, Measuring Memory Performance

MIT1203 - Database Management Systems

3 Credits

Introduction to Database Management Systems, Relational Data Model, Conceptual Design (ER Concepts and Terminology), Logical Design, Structured Query Language (SQL), and Data Normalization Process and the Normal Forms.

MIT1204 - Systems Analysis and Modelling

3 Credits

Information Systems and System Development Environments, Life Cycle, Methodologies and Software Process Models, Requirements Analysis and Discovery Methods, Feasibility Analysis, System Modelling, Computer Aided Systems Engineering Tools, System Concepts for Object Modelling, User Stories, UML, Use Case Modelling, Activity Diagrams, Conceptual Modelling and Structural Modelling Class and Package Diagrams, CRC cards, Behavioural Modelling, Interaction Diagrams, User Interface Flow Diagrams, Behavioural State Machines, UML 2.* Diagrams, System Modelling Using Case Studies, Rational Unified Process, Model Driven Engineering, Architecture and Executable UML.

SEMESTER 2

Following core/ compulsory course units shall be offered in semester 2.

MIT2201 - Computer Networking

3 Credits

Fundamentals in Data Communication and Transmission, Computer Networks, Channel Access Methods, Structure of the Internet, TCP/IP Protocol Suite, IP Addressing, Subnetting/Supernetting, Routing and Multicasting, Introduction to IPv6, Transport Layer Protocols, Application Layer Protocols, Wireless Local Area Networks (WLAN).

MIT2202 - Software Engineering

2 Credits

Introduction to Software Engineering, Software Quality Attributes; Software Processes: Waterfall Model, Prototyping Approaches, Evolutionary Development; Incremental Development, Rapid Application Development, Unified Process, Spiral Model, Agile Methods, Requirement Analysis and Specification, Software Design, Designing for Reusability, Adaptability, Maintainability, Software Architecture, MVC, Repository, Client-Server, Object Oriented Design, Design Patterns, Coding, Coding Practices, Code Reviews, Code Walkthroughs, Testing, Testing Strategies, Maintenance, Project Management, Quality Management.

MIT2203 - Data and Network Security

3 Credits

Introduction to Network Security, Introduction Cryptography, Hash Algorithms, Secure Secret Key (Symmetric) Systems, Public Key (Asymmetric key) Encryption Systems, Key Management Protocols, Operating Systems Security, Database Security, Program Security, Secure Electronic Mail, Authentication Protocols, Network Security Issues and Technologies, Web Security, Web Application Security, Legal Issues.

MIT2204 - Agile Software Development

3 Credits

Overview of Agile Software Development Process, Agile Web Application Development, MVC based Application Development, Content Management System based Application Development, User Interface/ UX Development, Full Stack Web Application Development, Agile Testing, Agile Application Security.

MIT2205 - IT Innovation

2 Credits

Theoretical perspectives, best practices in IT innovation, creative problem solving and strategies, impact of technological innovations on the economy and society, innovation skills needed for today's dynamic, global, and technology-enabled competitive environment, successful innovative product, commoditization of IT, strategic importance of the web as a platform, information organization, searching for knowledge, introduction to relevant tools and libraries, economics of digital goods and services, knowledge management in the corporate sector, challenges to innovation, disruptive innovation, managing, guiding, facilitating, nurturing the innovative ideas, solutions in software development organizations.

SEMESTER 3

(A) Following core/ compulsory course units shall be offered in semester 3.

MIT3201 - Individual Project

5 Credits

This course unit aims to enhance the capacity of candidates to develop project proposals and apply appropriate software engineering principles and adopt a suitable software development life cycle to develop an innovative application. This includes the analysis, design and development of a software application. The major expectations of this course unit are: conduct in relevant domain analysis to identify the requirements in order to address the problem and study similar systems and technologies; document the analysis, design and development (implementation) of the software solution; conduct an evaluation of the system which clearly demonstrates the technical quality using user evaluation and application of relevant quality assurance processes including the use of testing tools; submit a dissertation which will be evaluated and accepted; demonstrate the work at the oral examination.

**Students are required to initiate the individual project activities by the 9th week of their 2nd semester in order to provide sufficient time for students to prepare a proper project proposal prior to the start of the semester. As per the guidance of the Coordinator of the Individual project, you will be assigned to prepare the draft preliminary project proposal, select a supervisor, and get feedback from the supervisor for the draft proposal during this stage.*

Following optional course units shall be offered in semester 3.

MIT3202 - Project Management & Professional Issues in IT

2 Credits

Professional Issues in IT - ethical theories, professionalism and professional organizations, from theory to implementation; project management - introduction to project management, project integration, scope, time, cost management, IT project quality and communications management, project human resource management, financial calculations for project appraisals.

MIT3203 - The Foundations of e-Learning

2 Credits

e-learning theories and concepts - learning theories, from learning to e-learning, technologies, rules and standards for e-learning; planning and managing e-learning projects - planning e-learning, managing e-learning, evaluating e-learning; design and development of e-learning objects - instructional design methodology, developing e-learning content, delivering e-learning courses, emerging trends.

MIT3204 - Data Mining and Warehousing

3 Credits

Introduction to data mining, data warehouse and olap, data preprocessing, data mining knowledge representation, data mining algorithms, data mining algorithms: classification, evaluation techniques, data mining algorithms: clustering, advanced techniques, emerging trends.

MIT3205 - User Interface Design

3 Credits

Introduction, human factors - human perception and graphic design, human visualization, system colour theory and design principles, typography; design theory - elements of design, principles of design guidelines; evolving rich interaction - animation and video technology, multimodal technology; UI requirements - pact analysis, persona and scenario, task analysis; user-centred design - task design and help documentation, user assessment, UI software architectures; principles and heuristics of usability; prototyping, emerging trends.

MIT3206 - Mobile Computing

3 Credits

Introduction, operating systems for wireless mobile devices, android overview and Android development environment, anatomy of an android app and the app lifecycle, applications development for android devices with android studio, android user interface, Android intents & android persistence, android web view & web services, android animation and graphics, location-based apps, sensing and sensors, hybrid mobile app development, native mobile app development, mobile testing, mobile security.

SEMESTER 4

Following optional course units shall be offered in semester 4.

MIT4201 - Software Quality Assurance

3 Credits

Introduction, software quality factors, the components of a Software Quality Assurance (SQA) system (pre-project components, project life-cycle components including the design, development, testing and maintenance stages, infrastructure components, managerial aspects and human resource perspectives, standards, certification and assessment), software testing - strategies and implementation, software test automation (Selenium, TestNG, JUnit, JMeter and Fire Fly) introduction to test automation frameworks and paradigms, testing mobile applications (of Appium) continuous integration and build tools, performance testing, and new trends in quality assurance.

MIT4202 - IT Strategy and Policy

2 Credits

Policies in information domain - privacy and security policy, COBIT 5 and IT strategies, Val IT and GET IT, IT frameworks and models, emerging trends.

MIT4203 - Business Statistics and Operational Research

2 Credits

Basic Statistics - Introduction to Statistics and Data Collection Techniques, Graphical Representation of Data, Numerical Representation of Data, Introduction to Probability, Random Variables, Basic Probability Distributions, Hypothesis Testing, Analysis of Variance, Correlation and Regression Analysis; Operational Research - Introduction, Graphical Method, Simplex Method, Transportation Problems, Assignment Problems, Statistical Software Tools

MIT4204 - e-Business Applications and Strategies

3 Credits

The e-Business Environment, e-Business Application Development Tools, e-Customer Relationship Management, E-Procurement and Supply Chain Management, Electronic Payment Systems, e-Business Security, e-Marketing, Regulation of e-Business(Legal Issues) and Ethics, Future Directions in e-Business.

The syllabus applicable to each course shall be prescribed by the school from time to time and as approved by the Academic Syndicate.

4.3

Master of Information Security

DURATION

Two academic years, part-time, consists of four semesters (up to 15 weeks per semester).

LECTURES

Lectures and practicals will be conducted according to the time table.

ENTRY QUALIFICATIONS

a) A Bachelors Degree from a University or Institution recognized by the University Grants Commission and/or the University of Colombo **Or**

b) Any other academic or professional qualification deemed equivalent to a Bachelors Degree by the Senate of the University of Colombo

ADMISSION

The selection process consists of a written test followed by an interview.

CREDIT REQUIREMENTS

Course/Subject Description	Credit Value	Direct Staff-Student Contact Hours	Notional Hours (direct staff-student contact hours and independent learning)
Lecture course	1	15	50
Laboratory course	1	30	50
Individual project/ Independent Study	5	variable	500

One credit is considered equivalent to 50 notional learning hours for a taught course and laboratory course. In the case of project work/ Independent Studies, one credit is considered equivalent to a minimum of 100 notional hours.

PROGRAMME STRUCTURE

The programme has a number of courses and each course will carry a specified number of credits. Module descriptors for each course are available on VLE.

All four semesters consist of compulsory courses. Each student shall submit assignments as part of continuous assessment set by the school.

SEMESTER 1

Following core/ compulsory course units shall be offered in semester 1.

MIS1201 - Principles of Information Security

3 Credits

Introduction to information security, Introduction to cryptography, Digital signatures, Public-Key Infrastructure (PKI), e-mail security, Security Models and Policies, Program Security, Malicious Software, Operating system security, Privacy and Privacy Enhancement Tools, Social Engineering, Security threats on Social networks.

MIS1202 - Cryptographic Systems

3 Credits

Cryptography overview, one-way functions, pseudo-randomness, hash functions, symmetric encryption, authentication systems, public-key encryption systems, digital signature schemes, Interactive Proofs, Elliptic curve cryptosystems, Cryptographic protocols such as zero-knowledge protocols and e-voting, two-party secure computation, multiparty secure computation, and chosen-ciphertext security, Quantum Cryptography.

MIS1203 - Information Risk Management and Audit

2 Credits

Operative risk, Risk tolerance and risk appetite, Risk analysis and vulnerability assessment, Cost/benefit analysis, Communicating risk and developing risk metrics, Identifying risk mitigations, Acceptance Criteria, Internal Control .

MIS1204 - Network Security

3 Credits

Network authentication, Web security protocols such as SSL, VPN technology (IPSec), Security in IPV6 networks, Firewalls, Security in Web services, Intruder Detection and Prevention, DNS security

MIS1205 - Special Topics in Information Security *

2 Credits

Minimum of ten (10) and a maximum of fifteen (15) seminars will be conducted in the first semester.
* This course will continue in the second semester.

SEMESTER 2

Following core/ compulsory course units shall be offered in semester 2.

MIS2201 - Database Security

3 Credits

Introduction to Database Security, Database Authentication, Discretionary Access Control, Role-Based Access Control, Mandatory Access Control, Security threats with respect to SQL injections, Database Inference, Virtual Private Databases (VPD), Security in Statistical Databases, Encryption mechanisms in Databases, Database Auditing.

MIS2202 - Digital Forensics

3 Credits

Types of computer crime, Computer misuse, Data protection, Criminal damage, Software piracy, Forgery, Pornography, Unsuitable material, Cybercrime methodologies, Computer forensic investigative theory, Computer forensic processing techniques, File system forensic, Forensic network investigations, Linux for forensic analysis, Linux forensic tools, Forensic investigation on mobile devices.

MIS2203 - Security in Mobile and Wireless Networks

3 Credits

Overview of technologies and protocols, security threats and problems, Security features in protocols such as WPA, EAP, RADIUS and Bluetooth. Key Management Protocols:WPA/RSN,TKIP,AES–CCMP, Security in Ad Hoc Networks, Security in Wireless Wide Area Networks:GSM, 3G, UMTS, RFIDs and NFC Protocol.

MIS2204 - Data Mining for Information Security

3 Credits

Introduction to data mining, Concepts and methods, Major data mining methods: Data generalization,characterization, association, classification, clustering, and outliers analysis techniques, Stream data processing and stream data mining, Data mining for intrusion detection, Privacy-preserving data mining, Protection of information security in data mining.

SEMESTER 3

Following core/ compulsory course units shall be offered in semester 3.

MIS3201 - Information and Coding Theory

2 Credits

Entropy, Data Compression such as the Kraft inequality, Channel Capacity, Error Control Coding, Advanced Coding Techniques such as lattice codes, trellis coded modulation, coset codes, multi-level codes/multi-stage decoding, iterative decoding.

MIS3202 - Secure Software Systems

3 Credits

Secure software development life-cycle, Threat modeling, Risk assessment, Secure coding standards, Security code analysis, Security testing, Security code review, Empirical analysis for secure software development, Software model checking, Language-based security, Building verifiable systems, Managing Code and Documentation, Cryptographic modules for Java: JSA and JCE, Java Security Provider Architecture.

MIS3203 - Information Security Governance

2 Credits

Principles for information security practitioners, Information security management practices, with focus on governance, Business Model for Information Security (BMIS), with case studies, Threats, Compliance, Security Controls, Information security governance with the case study, Security Policy, Industry best practices, Business Continuity.

MIS3204 - Incident Management

2 Credits

Types of Computer Security Incidents, responding to various types of malicious activity such as the use of rootkits, botnets and distributed denial of service attacks, responding to insider threats and attacks, handling major computer security events and incidents, Incident management concepts, Scope and charter of incident management, Incident management objectives, Incident management metrics and indicators, Defining incident management procedures, Incident management resources, incident response capability, Elements of an incident response plan, Developing response and recovery plans, Testing response and recovery plans, Executing response and recovery plans, Documenting events, Post incident reviews.

MIS3205 - Individual Project

5 Credits

A student may undertake MIS 3205 in the Third Semester or opt to undertake MIS 4203 in the Fourth Semester. MIS 3205 shall span into the Fourth Semester as well.

**Students are required to initiate the individual project activities by the 9th week of their 2nd semester in order to provide sufficient time for students to prepare a proper project proposal prior to the start of the semester. As per the guidance of the Coordinator of the Individual project, you will be assigned to prepare the draft preliminary project proposal, select a supervisor, and get feedback from the supervisor for the draft proposal during this stage.*

SEMESTER 4

Following core/ compulsory course units shall be offered in semester 4.

MIS4201 - Cyber Security and Law

3 Credits

Secure e-commerce applications, Integrated Payment System, Electronic Payment Protocols, Cryptocurrency, Web application security,Cloud Security, Cyberwar, General Criminal Law Concepts, Intellectual property law, Electronic signatures law, Dispute resolution on the Internet, Digital criminal law, Common criminal Laws used in cyberspace.

MIS4202 - Multimedia Security and Digital Rights Management

3 Credits

Overview of multimedia contents dissemination and digital storage, digital rights management systems and technical trends, Steganography, Digital watermarking, Frequency domain based watermarking, Video watermarking, Multimedia quality measurements and enhancements, Watermarking and their vulnerabilities, examples of media protection schemes: CSS, CGMS, HDCP, Emerging DRM Standards

MIS4203 - Independent Studies in Information Security

5 Credits

Independent studies in Information Security should result in laboratory reports or log forms. Minimum of ten (10) and a maximum of fifteen (15) independent studies in Information Security will be given under this course.

A student may undertake MIS 3205 in the Third Semester or opt to undertake MIS 4203 in the Fourth Semester. MIS 3205 shall span into the Fourth Semester as well. A student shall take either MIS 3205 or MIS 4203.

- The Independent Studies in Information Security in the fourth semesters of the programme shall consist of minimum of ten (10) studies and maximum of fifteen (15) studies which solve the given set of problems and submission of a report based on the solutions to the problems.

- Each student who undertakes Independent Studies in Information Security should submit a report based on the solutions to the problems together with Log Forms at the end of the fourth Semester. An oral examination of this report will be held.

- Students shall submit Assignments as a part of Continuous Assessment.

The syllabus applicable to each course shall be prescribed by the school from time to time and as approved by the Academic Syndicate.

4.4

Master of Business Analytics

DURATION

Two academic years, part-time, consists of four semesters (up to 15 weeks per semester).

LECTURES

Lectures and practicals will be conducted according to the time table.

ENTRY QUALIFICATIONS

a) A Bachelors Degree from a University or Institution recognized by the University Grants Commission and/or the University of Colombo **Or**

b) Any other academic or professional qualification deemed equivalent to a Bachelors Degree by the Senate of the University of Colombo

ADMISSION

The selection process consists of a written test followed by an interview.

CREDIT REQUIREMENTS

Course/Subject Description	Credit Value	Direct Staff-Student Contact Hours	Notional Hours (direct staff-student contact hours and independent learning)
Lecture course	1	15	50
Laboratory course	1	30	50
Individual project/ Independent Study	5	variable	500

One credit is considered equivalent to 50 notional learning hours for a taught course and laboratory course. In the case of project work/ Independent Studies, one credit is considered equivalent to a minimum of 100 notional hours.

PROGRAMME STRUCTURE

The programme has a number of courses and each course will carry a specified number of credits. Module descriptors for each course are available on VLE.

First and second semesters consist of compulsory courses while the third and fourth semesters consist of both compulsory and optional courses.

SEMESTER 1

Following core/ compulsory course units shall be offered in semester 1.

BA1001 - Business Statistics

3 Credits

This course introduces the student to business statistics and the application of statistics in present-day work environments. The course focuses on the three fundamental aspects of statistics as methods for data gathering and preparation, data analysis, and interpretation. The course layout is as follows:

Gathering of data: Data and variables, Surveys and Census, Sample and Sampling techniques, Data collection methods, Basic data mining techniques; ***Visualizing and describing data:*** Graphical methods, Numerical methods, measures of association between variables, time series data, Misuses of the statistics, Use of statistical packages; ***Measures of uncertainty:*** Quantifying uncertainty, Measuring uncertainty using probability, Conditional Probability, Bayes' Theorem, Making decisions with uncertainty ; ***Probability Distributions:*** Random Variables, Expected value and Variance, Discrete probability distributions, Continuous Probability Distributions; ***Prediction and optimization:*** Deterministic techniques, Linear Programming technique

BA1002 - Organizational Data Management

2 Credits

In this course, the students will learn how to oversee, protect and make efficient use of data for various organizational settings. The organizational environments include government departments and offices, educational institutes, corporates etc. The courses focus on data management aspects with respect to organizations and data governance. Core topics of this module are:

Data Management vs Data Governance: Overview of data management, Characteristics of organization data, Data governance as a concept, Importance of data governance, analyzing the relationship with data management and data governance; ***Data Architecture:*** Models, policies, rules and standards that govern how data is collected, stored, arranged and integrated and used in systems/ organizations; Data Modeling and Design, Data Storage and Operations, Data Integration and Interoperability; ***Data Security:*** Technology-based methods: Software and Hardware methods, disk encryption, backups, data masking and erasure, Laws and Standards: Sri Lankan laws on data security; Data Maintenance, Metadata, Data Quality

BA1003 - Fundamentals of Data Science and Business Analytics

2 Credits

This is an introductory course in data science where the student will learn the fundamental aspects of the discipline including the definitions, process and sub-disciplines (e.g. Business Analytics). In addition, the course discusses the state of the art applications in data science and business analytics and contemporary application areas and trends. The core focuses include:

Data: Definition of data, Characteristics of small data, massive data and big data, Structured vs Unstructured data; ***Data Science:*** What is Data Science? Big data and data science, Skills for data science, Importance of business analytics, Fundamental building blocks of data science; ***Data Wrangling:*** Various data sources and types, Aspects of big data, Data integration and processing techniques, Data preparation and integration techniques for business analytics; ***Overview of Data Modeling and Analysis Techniques:*** Supervised and unsupervised models, Associated rule mining, Exploratory techniques; ***Applications of Data Science as Case Studies***

BA1004 - Data Programming

3 Credits

Programming and the ability to manipulate data using programming languages and relevant packages is an essential skill for any data scientist. This course introduces the data programming languages and associated essential third-party tools which enables the student to gain programming practice on developing solutions to business analytics problems. The main programming focus includes:

R Programming: Introduction to R Programming Language and R studio, Functions in R, Control Flow and Loops, Vectors and Metrics in R, Reading and Writing Data, Integration with Databases, Simulation and Profiling, Model fitting, Graphics packages in R; ***Python Programming:*** Introducing to Python Language, Lists, Functions and Packages, Control Flow and Loops, Scientific Packages (NumPy, Pandas, Mathplotlib etc), git integration, Jupiter Notebooks; ***Contemporary Data Science Tools and Packages***

SEMESTER 2

Following core/ compulsory course units shall be offered in semester 2.

BA2001 - Statistical Inference for Analytics

3 Credits

This course introduces the concept of a sampling distribution and how such concepts are applied to real-world problems in order to estimate parameters, form hypotheses, and to communicate findings effectively. The core content of this course is as follows:

Sampling Distributions: Central Limit Theorem; Sampling Distribution of sample mean, Sampling Distribution of sample proportions; Estimation: Point estimation, Properties of estimates, Interval Estimation, Determining Sample Sizes, Large and Small Sample cases; ***Hypothesis Testing:*** Null and Alternative

Hypotheses; Type I and Type II Errors; One and Two-Tail Tests, One sample test, Testing hypothesis about the parameters, Two-sample tests, Comparing hypothesis about the parameters, Testing Associations, Non-parametric techniques; ***Comparing more than two Samples:*** Analysis of Variance (ANOVA), Repeated measures ANOVA, Multivariate ANOVA; ***Statistical Modelling:*** Linear regression models

BA2002 - Machine Learning and Pattern Recognition

3 Credits

Machine learning and pattern recognition belong to two core areas of contemporary data science. This course introduces the fundamental learning paradigms, pattern recognition algorithms and how this knowledge can be used to model business problems as a machine learning task. The core content of the course include:

Fundamentals of Machines Learning and Pattern Recognition: Types of machine learning problem, Overview of machine learning algorithms, Application of machine learning and pattern recognition in business environments; ***Features:*** Feature extraction and feature selection methods; Classification: Types of classification, Bayesian decision theory and pattern classifications, Naïve Bayes classification, Bayesian Belief Networks, Tree-structured classification; ***Supervised Learning:*** Perceptron learning, Backpropagation learning and its variants, Random forests, Support vector machines; ***Unsupervised Learning:*** Hebbian learning, K-means concepts and its variants, Self-Organizing Maps and Neural Gas Algorithm; ***Combining Classifiers:*** Classifier fusion techniques, Bagging and boosting techniques.

BA2003 - Data Warehousing and Mining

3 Credits

This course introduces the concepts of data warehousing and data mining and its applicability to the modern day data science landscape. Students will be introduced to critical components of a data warehouse architecture and to use these components to design data warehouses to support and provide efficient and practical solutions to business problems. The core content of the course include:

Data Warehousing: Introduction to data warehousing, Data warehouse architectures, Multidimensional data model, Concept hierarchies, Attribute generalizations and relevance, Online analytical process, Business intelligence tools and visualizations; ***Data Mining:*** Fundamentals of data mining, Knowledge extraction process, Data and data exploration, Frequent itemsets mining, Association rule mining, Classification and cluster analysis, Web mining.

BA2004 - Information Visualization

3 Credits

It is said that a picture says a thousand words. Similarly, a properly done visualization of real-world data can sometimes solve the problem without any more inferences or modelling. Hence, this course presents the techniques of information visualization that enables the student to create efficient and impactful visualizations. The core content of the course include:

General Concepts: Purpose of visualization, what is visualization? Functions of visualizations, why do we create visualizations?; ***Visualization Design, Organization and Evaluation:*** Types of data in visualization, Bertins' levels of organization, Mackinlays' Criteria, Perception, gestalt, Interaction methods, Layouts, Deconstruction visualization, Aspects of Color in Visualizations, Animations, Evaluating visualizations; ***Exploratory Data Analysis:*** Data wrangling, Types of models, Types of Variables, Statistical Model, Hypotheses testing using graphical data, Visual Analytics

BA2005 - Technical Writing

It is said that a picture says a thousand words. Similarly, a properly done visualization of real-world data can sometimes solve the problem without any more inferences or modelling. Hence, this course presents the techniques of information visualization that enables the student to create efficient and impactful visualizations. The core content of the course include:

General Concepts: Purpose of visualization, what is visualization? Functions of visualizations, why do we create visualizations?; ***Visualization Design, Organization and Evaluation:*** Types of data in visualization, Bertins' levels of organization, Mackinlays' Criteria, Perception, gestalt, Interaction methods, Layouts, Deconstruction visualization, Aspects of Color in Visualizations, Animations, Evaluating visualizations; ***Exploratory Data Analysis:*** Data wrangling, Types of models, Types of Variables, Statistical Model, Hypotheses testing using graphical data, Visual Analytics

SEMESTER 3

(A) Following core/ compulsory course units shall be offered in semester 3.

BA3001 - Modelling and Simulation of Data

3 Credits

In today's world, large enterprises and business as well as the research community resort to see the effects of products, phenomena by developing data models based on a set of rudimentary parameters and refining them. These models are then simulated using various techniques in an attempt to forecast or identify future trends and/or to further refine the models. This course introduces the mathematical and practical aspects of data modelling and simulation. The core content of the course include:

What is Simulation?: Introduction to Simulation, Concept of system, model and simulation, Components

of discrete event simulation, Advantages and disadvantages of simulation; ***Statistical models in simulation:*** Probability distribution functions, Estimation of statistical parameters, Characteristic of a queueing system, Simulation of single server queueing system, Generation of Random number and Random number Variates , Testing of random numbers; ***Input modelling:*** Estimation of parameters, Fit tests of distributions; ***Output data analysis for single system:*** Statistical analysis for terminating and non-terminating simulations, Comparing alternative system configurations, Verification, validation and credibility of simulation models, Simulation of manufacturing and material handling systems, Monte Carlo simulation

BA3002 - Predictive Analytics

3 Credits

This course will introduce to the students the core principles and challenges associated with predictive modelling and analytics of modern day data. Modelling will discuss the widely used techniques and tools and their applicability towards various kinds of data problems. The core topics include:

An Introduction to Predictive Analytics: The predictive analytics process, different types of models (predictive, descriptive and decision), Application of predictive analytics, Mathematical basics for predictive analytics; ***Data:*** Types of data in the business domain, cleaning up data and data wrangling, Dealing with missing values and outliers, Adding and removing variables.; ***Regression Models:*** Linear regression, Non-linear regression, Logistic regression, Multiple regression, Model diagnostic; Classification: Classification Problem, Classification Models; ***Trees:*** Tree models, Decision trees, Classification trees, Regression trees, Random forests; ***Time-Series Prediction:*** Time series modelling and prediction; ***Validation Techniques:*** Model validation, Out of sample validation, Cross-validation methods; ***Representation Learning and Goodness Measures:*** Dimensionality Reduction, Decorrelation, Clustering, Bias vs Variance trade-off, Uses of the Confusion matrix

BA3003 - Computational Social Science

3 Credits

Computational social science is concerned with computational approaches to social sciences. In this course data based models will be implemented with the intention of modelling, simulating and analysing social phenomena.

(B) Following optional course units shall be offered in semester 3.

BA3004 - Applied Optimization + (Not offered for 2022/23 Intake)

3 Credits

This course focuses on how to build mathematical and statistical models that capture the essentials of real-world data science problems. The main aim is to provide students with modelling skills to practical problems with an emphasis on different modelling choices and their effects on solvability and planning under uncertainty. Topics include

Linear programming: The structure, assumption, formulation, and the solution of a linear programming problems with suitable examples Graphical interpretation of a linear programming problem with two decision variables Displaying and solving linear programming models on a Spreadsheet; ***Solving linear programming problems using simplex method:*** The essence of the simplex method, setting up the simplex method, algebra of the simplex method, and simplex method in tabular form Spreadsheet Solution for Linear Programming Problem; ***Duality theory, and sensitivity analysis:*** The essence of duality theory, economic interpretation of duality, primal-dual relationships, examples and interpretations. The essence of sensitivity analysis, the role of duality theory in sensitivity analysis, applying sensitivity analysis to linear optimization problems; ***Integer Programming:*** Models with integer programming formulations, Gomory's Cutting Plane Algorithm, A Branch and Bound Algorithm. Spreadsheet solution for integer programming problems; ***Transportation and Assignment problems:*** Characteristics of transportation problems, modeling variants of transportation problems, applications. Characteristics of assignment problems, modeling variants of assignment problems, applications; ***Network optimization problem:*** The terminology of networks, the shortest path problem, the minimum spanning tree problem, the maximum flow problem, the minimum cost flow problem, the network simplex method

BA3005 - Open Source Intelligence + (Not offered for 2022/23 Intake)

3 Credits

With the increase in the use of technology, the amount of unstructured data available through public means have increased significantly. Hence, mining these unstructured public sources of data and obtaining information in an intelligence context has now become a modern-day requirement. This course introduces the aspects of OSINT in a data science perspective. This course focuses on the following topics:

Understanding Open Source Intelligence (OSINT) objectives and techniques as an intelligence gathering discipline; Operational security, staying anonymous on the Internet; Software tools and online services usable for gathering, processing, and analysis of raw data; Evaluating and classifying data retrieved through OSINT gathering techniques.; Image and photo tracking, tracing, and analysis. ; Locating and verifying social media profiles and identities; Acquiring data from protected social media accounts. ; Cryptocurrency transactions and blockchain analysis; The Dark Web.; Counterintelligence techniques used by the criminal elements.

BA3006 - Text Analytics +

3 Credits

The dominance of textual information on the Internet and other digital sources has made mining high-quality information from text a critical task in modern day data mining. The knowledge obtained via mining and analysis of textual data makes an impact on many areas such as business intelligence, social behaviour analysis and sentiment identification. In this course, the core focus will be as follows:

Introduction to Text Analytics, Treating Text as Data – Feature; Nature of Text, Document representation, Culture and Concordance; Text & Interaction, Content Analysis, Frequency Analysis, Co-Occurrence and N-grams; Information extraction: term extraction, named entity recognition, relation extraction, fact and event extraction; partial analysis vs. full analysis; Natural Language Processing, Part of Speech Tagging, Information Extraction and Dependency Parsing; Ethics in Text Mining, Resources for text mining: annotated corpora, computational lexica, ontologies, computational grammars; design, construction and use issues; Classification, Clustering: K-Nearest Neighbors, Simple Predictive; Topic Modelling and Dimensionality Reduction, Issues in large scale processing of text: distributed text mining, scalable text mining systems; Sources of text and social network data, Techniques to pre-processing text and social network data, The key metrics used in social network analytics (e.g. degree centrality, betweeness centrality, closeness centrality, etc.), Classification with social network techniques; Applying text mining and social network techniques in social media analytics

BA3007 - Individual Project **

5 Credits

The core intention of the individual project is for the student to identify a contemporary research problem in data science or business analytics and to advance the problem via scientific method under the guidance of a subject expert.

**Students are required to initiate the individual project activities by the 9th week of their 2nd semester in order to provide sufficient time for students to prepare a proper project proposal prior to the start of the semester. As per the guidance of the Coordinator of the Individual project, you will be assigned to prepare the draft preliminary project proposal, select a supervisor, and get feedback from the supervisor for the draft proposal during this stage.*

** A student may undertake BA 3007 in the third semester or opt to undertake BA 4005 in the fourth semester. BA 3007 shall span into the fourth semester as well. A student shall take either BA 3007 or BA 4005.

+ A student shall take one (01) course from either of BA 3004, BA 3005 or BA 3006 during the third semester.

SEMESTER 4

(A) Following core/ compulsory course units shall be offered in semester 4.

BA4004 - Confidential Information and Legal Regime

2 Credits

In the present context, data is being generated in both structured and unstructured forms and is being stored in massively distributed databases. The data collected via these multifarious forms could be of any nature including private information, trade secrets, policy data etc. This course views data in a legal perspective and studies the applicable laws in Sri Lanka with respect to data. The course content is as follows:

Legal Aspects of Data: Sensitivity of information, Storage, Defining organizational data policy, defining public and private information; ***Right to Information Act***

(B) Following optional course units shall be offered in semester 4.

BA4001 - Big Data Analytics ^

2 Credits

The objective of this course is to discuss the aspects of big data and it's evolvement in the modern day context. The core focus will be on each aspect of big data, their implications on the modelling techniques, algorithms and big data, identifying modern day trends and technologies used to manipulate and store big data. This course outline is as follows:

Fundamentals: Differentiation between different big data models (5v's, 7 v's), Difference between a common data analytics tasks and big data analytics tasks, challenges in modern day data, streaming data; ***Software use for Analysis, Assessing the Quality of Big Data Analysis, Application Areas:*** Image Analysis, Recommender System, Speech Recognition Systems, Streaming Data

BA4002 - Analytics for Process Improvement ^

2 Credits

Processes are an essential part of any organization who strives continuously improve them. The improvement to the processes is usually motivated by inadequacies of the process or to obtain financial benefits. This course focuses on process improvement originating from data analytic models and reports. The main topics include:

Introduction to Analytics for Process Improvement: Process mining, types of process mining, How does process mining relate to data mining and analytics, Types of analysis methods; ***Process Models and Process Discovery:*** Using event data in process management, Event logs and process models; ***Different Types of Process Models:*** Four quality criteria for process discovery, Representation bias of process discovery,

Business process model and notation, Process mining in the large; ***Process Discovery Techniques and Conformance Checking:*** Two-Phase Process Discovery And Its Limitations, Alternative Process Discovery Techniques, Conformance Checking: Positive and Negative Deviants, Conformance Checking, Exploring event data; ***Enrichment of Process Models:*** Mining Decision Points, Discovering Data Aware Petri Nets, Holistic Process Mining: Integrating Different Perspectives, Mining Bottlenecks, Mining Social Networks, Comparative Process Mining Using Process Cubes, Refined Process Mining Framework; ***Operational Support and Conclusion:*** Operational Support: Detect, Predict and Recommend, Guidelines for Logging, Process Mining Software, Mining Lasagna Processes, Mining Spaghetti Processes, Process Models as Maps, Data Science in Action.

BA4003 - Intelligent Agents in Gaming ^ (Not offered for 2022/23 Intake)

2 Credits

Intelligent agents are simple processes operating in multifarious environments and circumstances. With the availability of large repositories of data belonging to gaming such as gambling, video games there is a significant incentive to develop intelligent agents whose actions, decisions and capabilities driven by data. The outline of the course include:

Agent Modeling: Fundamentals of player modeling, Opponent modeling, Distinguishing player modelling and opponent modelling; ***Types of Agent Models:*** Data-driven agent models, Action-based models, Learning techniques for Agent Models; ***Gaming and Agents:*** How to design intelligent agents, Single-agent systems vs multi-agent systems.

BA4005 - Independent Studies in Business Analytics

5 Credits

The independent study enables the students to put into practice the concepts studied throughout the entire course to solve real-world problems. In this course, consists of a number of real-world problems given to students as tasks in which they will use the knowledge gained through the course to solve these real-world problems.

^ A student shall take two (02) courses from BA 4001, BA 4002 or BA 4003 during the fourth semester.

The syllabus applicable to each course shall be prescribed by the school from time to time and as approved by the Academic Syndicate.

4.5

Master of Cybersecurity

DURATION

Two years part-time course of four semesters (15 weeks per semester).

LECTURES

Lectures and practicals will be conducted according to the time table.

ENTRY QUALIFICATIONS

a) A Bachelors Degree from a University or Institution recognized by the University Grants Commission and/or the University of Colombo **Or**

b) Any other academic or professional qualification deemed equivalent to a Bachelors Degree by the Senate of the University of Colombo

ADMISSION

The selection process consists of either a written test or an interview.

CREDIT REQUIREMENTS

Course/Subject Description	Credit Value	Direct Staff-Student Contact Hours	Notional Hours (direct staff-student contact hours and independent learning)
Lecture course	1	15	50
Laboratory course	1	30	50
Individual project/ Independent Study	5	variable	500

One credit is considered equivalent to 50 notional learning hours for a taught course and laboratory course. In the case of project work/ Independent Studies, one credit is considered equivalent to a minimum of 100 notional hours.

PROGRAMME STRUCTURE

The programme has a number of courses and each course will carry a specified number of credits. Module descriptors for each course are available on VLE.

All four semesters consist of compulsory courses. Each student shall submit assignments as part of continuous assessment set by the school.

SEMESTER 1

Following core/ compulsory course units shall be offered in semester 1.

MC1001 - Principles of Cybersecurity

3 Credits

Introduction to computer security, threat and its definition based on the different domains. Real world examples of security failures and their consequences.

Basics in software security and vulnerability. Basics in cryptography, PKI infrastructure,Basics in Web Security. Common web vulnerabilities. Web UI attacks and web tracking. Introduction to network security and Network level attack. Access control, OS security. The human aspect of the security triad. Social Engineering. Privacy in the digital age. Cybersecurity Management Concepts. The Future of Cyber Security.

MC1002 - Cryptographic Systems

3 Credits

Cryptographic Overview: Cryptographic Systems Overview, Mathematical Background for Cryptographic

Systems, Diffie-Hellman Key Exchange, Public Key, Block Ciphers, Hash Functions, Random Numbers,Elliptic Curve Cryptography. Cryptography Protocols: Zero-Knowledge Proofs, E-Voting, Two-party Secure Computation, Multiparty Secure Computation, Chosen-Ciphertext Security, Homomorphic Encryption, Quantum Cryptography.

MC1003 - Network protocols and standards

2 Credits

Network Fundamentals. Network Interface Layer. Internet Layer (Network). Transport Layer. Switching and Routing protocol Fundamentals. IP Multicast Protocols and Fundamentals.Application layer protocols. QoS and Bandwidth control. Wireless protocols. Mobile communication protocols.

MC1004 - Network Design

3 Credits

Introduction to Network life cycle, Design Fundamentals, Failure modeling, Business Driven Design, Centralization Versus Decentralization. Networking models & Network Architectures. Network Modularity and Hierarchical Design Patterns. Robustness basics of Network Design. Common Network Topologies and Tree Structures. Considering Complexity on Network Designing. Design Considerations of Advanced Network Technologies and Services. Securing the Network. VLAN design, security aspects of VLANs. DNS. Threat modeling in a network point of view. Performance modeling. Data Center Design. Software-Defined Networks.

MC1005 - Special Themes in Cybersecurity*

2 Credits

Onion routing, Tor. Bitcoin ecosystem. The criminal ecosystem surrounding bitcoin and blockchain. Use case studies: Silk Road, Bangladeshi central bank heist, Human Trafficking and Bitcoin, Stuxnet. Edward Snowden - whistleblowing in the age of Big Brother. Social Networks and Democracy. Security in Medical equipment.

* This course will continue in the second semester.

SEMESTER 2

Following core/ compulsory course units shall be offered in semester 2.

MC2001 - Database Security

3 Credits

Introduction to Database Security. Database View. Database Authentication. Discretionary Access Control. Role Based Access Control. Mandatory Access Control. Mandatory Access Control - Label Security. Security threats with respect to SQL injections. Virtual Private Database (VPD). Database Inference. Database Inference - Tracker Method. Statistical Database, Database Auditing - Standard Auditing. Database Auditing - Fine-Grained Auditing. Encryption mechanisms in Databases.

MC2002 - Software Vulnerability Analysis

3 Credits

Malicious codes. OWASP Top ten vulnerabilities. Vulnerability scanning. Secure Software Development - Introduction. Build Security In and SSE Methodologies. Threat Modelling. Software Security Touchpoints. Code Quality and Security Analysis. Threat Analysis. Secure Software Engineering -Capability Maturity Model. Threat Modelling with Threat Modelling Tool I and II. Secure Infrastructure for Secure Software I and II.

MC2003 - Network Security

3 Credits

Network interface layer security. Security considerations in routing protocols. Transport layer: Enumeration (port scanning and sniffing), attack surface analysis and tools. Network authentication and protocols. Application layer security: Remote connectivity, Secure communication, Web security, Web security - Vulnerability assessment and penetration testing and tools, Email security. Security Operations Centre. Cloud computing, Software Defined Networks and security. Defining a trust base. Endpoint security: Data Leakage Prevention, Host-based Intrusion Detection Systems.

MC2004 - Security in Mobile and Wireless Networks

3 Credits

Evolution of Standards and Mobile Networks. Wireless network planning and design: Infrastructure and ad-hoc, Physical layout and security concerns. Security in WiFi networks:WEP, WPA, WPA2, WPS, 802.1x. Bluetooth Security. NFC security. IoT and wearable. GSM Security. LTE security. Mobile applications and security considerations. Android Cryptography.

SEMESTER 3

Following core/ compulsory course units shall be offered in semester 3.

MC3001 - Digital Forensic

3 Credits

Introduction to Digital Forensics and Investigative Process. Essential Skills - Forensic Documentation, Data Interpretation, Tools of the Trade. File System Forensics : Disk Image Acquisition, Disk Image Manual Interpretation, Disk Image Analysis with Tools. Windows Forensics Basics and Analysis. Mobile Forensics. Memory Forensics. Internet Forensics. Email and Instant Messaging Forensics. Emerging Trends in Digital Forensics.

MC3002 - Cybercrime and Legal Regime

2 Credits

General Criminal Law Concepts. Common criminal Laws used in cyberspace. Types of jurisdiction and Issues of the jurisdiction in cyberspace. Digital Evidence and seizures of Digital Evidence. The Nature of Digital Searches and Warrants for Digital Evidence. Electronic signatures law, Dispute resolution on the Internet. Cyber Stalking/Harassment. Cyber Pornography. Cyber Terrorism and Cyber Defamation. Intellectual Property laws and Issues in Cyberspace.

MC3003 - Open Source intelligence

3 Credits

Understanding Open Source Intelligence (OSINT) objectives and techniques as an intelligence gathering discipline. Operational security, staying anonymous on the Internet. Software tools and online services are used for gathering, processing, and analysis of raw data. Evaluating and classifying data retrieved through OSINT gathering techniques. Image and photo tracking, tracing, and analysis.Locating and verifying social media profiles and identities. Acquiring data from protected social media accounts. Cryptocurrency transactions and blockchain analysis. The Dark Web. Counterintelligence techniques used by the criminal elements.

MC3004 - Incident Response Management

2 Credits

Types of Computer Security Incidents. Responding to various types of malicious activity such as the use of rootkits. Botnets and distributed denial of service attacks. Malware Persistence Detection. Insider Threats: Responding to insider threats, Cyber threat intelligence, Threat hunting. Handling major computer security events and incidents. Incident management principles and concepts. Scope and charter of incident management. Incident management objectives. Incident management metrics and indicators. Defining incident management procedures. Incident management resources. Incident response capability. Elements of an incident response plan. Real incident response strategies and methods. Remote and enterprise incident response. Evidence collection. Developing response and recovery plans. Testing response and recovery plans. Executing response and recovery plans. Documenting events Post incident reviews. Legal aspects of Incident Management.

MC3005 - Technical Writing

Encounters with technical communication Everyday. Technical communication in practice. Ethics in technical communication. Document design and content. Graphics: power, color, content, ethics. Preparing technical report. Preparing research report. Preparing oral presentations. Preparing project proposal. Create Brochure.

SEMESTER 4

Following core/ compulsory course units shall be offered in semester 4.

MC4001 - Information Security Audit

2 Credits

The cycle of threats, vulnerabilities, risks, and counter-measures. Information Security Models. Information Security Risk. Risk management. Quantitative risk management. Information Security Management. Information Security Program. Information Security Policies. Information Classification – Criteria – Owner – Custodian – User. Privacy principles. Authentication, Authorisation, and Accounting. Security Controls. Information Security Auditing. Security Auditing and Reporting. Computer Ethics.

MC4002 - Network Troubleshooting

3 Credits

Introduction to Network Troubleshooting and Harding by Network Planes:Data Plane, Control Plane, Management Plane. Structured Troubleshooting Approaches. Integrating Troubleshooting into the Network. Maintenance Process and Hardening. Network Troubleshooting Tools. Troubleshooting Network Hardware Issues and Failure Domains. Troubleshooting and Hardening of Network System Components. Troubleshooting and Hardening Layer 2 Forwarding/Switching. Network Link Failures and Troubleshooting. Troubleshooting and Hardening Layer 3 Forwarding/Routing. Troubleshooting IP Services. Troubleshooting and Hardening Basics of Routing Protocols, Distance Vector, Link State, Hybrid. IP Multicast Troubleshooting, Security and Hardening.

MC4003 - Independent Studies in Cybersecurity

5 Credits

Study 01 - Digital Forensic - File Systems

Study 02 - Digital Forensic - Memory Analysis

Study 03 - Web Vulnerabilities - Analysis

Study 04 - Web Vulnerabilities - Attacks

Study 05 - Building a Secure E-Commerce Portal Using CMS

Study 06 - Software Defined Radio (SDR) for Wireless Security

Study 07 - Android Security

Study 08 - Web Application Penetration Testing

Study 09 - Bitcoin

Study 10 - Capture the flags

The syllabus applicable to each course shall be prescribed by the school from time to time and as approved by the Academic Syndicate.

05

General Guidelines

GRADING SYSTEM

The percentage score obtained in respect of each course of the degree programme shall be converted into a Grade according to the scheme given below:

Table 1: Grades & their Respective Grade Point Values

Range of Marks	Grade	Grade Point Value (GPV)
90 – 100	A+	4.25
80 – 89	A	4.00
75 – 79	A-	3.75
70 – 74	B+	3.25
65 – 69	B	3.00
60 – 64	B-	2.75
55 – 59	C+	2.25
50 – 54	C	2.00
45 – 49	C-	1.75
40 – 44	D+	1.25
30 – 39	D	1.00
20 – 29	D-	0.75
0 – 19	E	0.00
0	NC	0.00

*NC –Not Completed

Computation of Grade Point Average (GPA)

Computation of GPA is performed based on the formula given below.

$$\left[\frac{\sum \text{GPV of compulsory course} * \text{credit value of compulsory course} + \sum \text{GPV of optional course} * \text{Credit value of optional course}}{\sum \text{credit value}}\right]$$

DISTINCTION

- A student who has qualified for the award of the Degree by completing all the relevant requirements may be awarded Distinction if he/she has obtained GPA of not less than 3.50, provided he/she had completed the degree at the first attempt.

ACADEMIC EXCELLENCE AWARDS

Students of each programme are entitled to the following convocation awards based on their academic excellence.

Graduation Awards (Awarded at the Convocation)

- Award for the Best Student in Master of Information Technology
- Award for the most outstanding student in the Master of Information Security degree
- Award for the Best Student in Master of Computer Science
- Award for the Best student in Master of Science in Computer Science
- Award for the Best student in Master of Business Analytics
- Award for the Best student in Master of Cybersecurity

REPEATING A COURSE/ SUBJECT

- A student who obtains less than C grade after the evaluation of any course will be allowed to re-sit for the evaluation of that course provided that the course is offered. The higher mark of the reappearances will be taken into consideration.

EXIT POINTS FROM THE DEGREE PROGRAMME

A student is able to make use of the following qualifications, to exit from the degree programme.

- Postgraduate Diploma
- Postgraduate Certificate

In order to obtain the Postgraduate Diploma qualification, the student should fulfil the following academic requirements.

- he/she has obtained a GPV of not less than 2.00 for Courses which add up or exceed 25 credits;
- he/she has obtained a minimum of 2.00 of GPA;

In order to obtain a Postgraduate Certificate qualification, the student should fulfil the following academic requirements.

- he/she has obtained a GPV of not less than 2.00 for Courses which add up or exceed 20 credits;
- he/she has obtained a minimum of 2.00 of GPA;

MINIMUM REQUIREMENT TO OBTAIN A DEGREE

The Master of Computer Science, Master of Information Security, Master of Information Technology, Master of Business Analytics, Master of Cybersecurity

A Student who has satisfied the following conditions will qualify to obtain the corresponding masters degree.

- not less than a GPV of 2.00 in the Courses which make up a minimum of 35 Credits;
- not less than a GPA of 2.00 for all the Courses which make up a minimum of 45 Credits; and
- not less than a C Grade (Pass) for the Independent Study/ Individual Project.

The Master of Science in Computer Science

A Student who has satisfied the following conditions will qualify to obtain the Degree of Master of Science in Computer Science.

- not less than a GPV of 2.00 in the Courses which make up a minimum of 50 Credits;
- not less than a GPA of 2.00 for all the Courses which make up a minimum of 60 Credits; and
- not less than a C Grade (Pass) for the Individual Research.
- obtained grades of D or superior for all the compulsory courses.

A student who has opted to follow the Master of Science in Computer Science degree programme is allowed to withdraw his/her registration from that programme, provided that he/she has obtained permission from the School for such withdrawal. Instead, such student is permitted to obtain the Master of Computer Science degree subject to conditions applicable to that Degree programme.



Reception Area

PROGRAMME ADMINISTRATION



Head Postgraduate Programmes

Prof. T N K De Zoysa
B.Sc. (Col), Ph.D. (Stockholm), MIEEE

MASTER OF COMPUTER SCIENCE/ MASTER OF SCIENCE IN COMPUTER SCIENCE



Programme Coordinator

Dr. A P Sayakkara
PhD (UCD, Dublin), B.Sc. (Hons) (Colombo), SMIEEE



Project Coordinator: MCS and MSc in CS

Dr. K A K T Karunanayake
BSc (Hons)(Mora), Ph.D. (NUS)

MASTER OF INFORMATION TECHNOLOGY



Programme Coordinator

Dr. H E M H B Ekanayake
B.Sc. (Col), M.Phil. (Col), Ph.D. (Stockholm University, Sweden)



Project Coordinator

Dr. (Ms.) H N D Thilini
B.Sc. (Col), Ph.D. (Col)

MASTER OF INFORMATION SECURITY



Programme Coordinator

Dr. P V K G Gunawardana
BSc Hons (Col), PhD (Monash)



Project Coordinator

Mr. P K M Thilakarathne
BIT, MPhil

MASTER OF BUSINESS ANALYTICS



Programme Coordinator

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MASTER OF CYBERSECURITY



Programme Coordinator

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SERVICES OF POSTGRADUATE DIVISION

Postgraduate Division of the UCSC is the administrative office for postgraduate programmes studies at UCSC.

The division supports the students on matters related to the new admissions, renewal of registrations, ID cards, certification letters, student appeals, learning system (PGVLE) access and other student services provided by the UCSC.

Email	msc@ucsc.cmb.ac.lk
Tel	11- 2581245/ 7 Ext. 8994
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Registration Process

Successful candidates in the selection process shall register for the programme by paying applicable course fees. For more information, please visit: *https://ucsc.cmb.ac.lk/academic-programmes/postgraduate-programmes/*

Note: Students are required to pay full payment at the registration. payment plan is also introduced for the needy students.

The division maintains a personal file with the following information of each registered student.

- Certified copy of Birth certificate
- Certified copy of National identity card/ Passport
- Certified copy of Degree certificate(s)
- Certified copy of Academic transcript(s)
- Certificates of other educational/ professional qualifications
- Service letters from the previous and current employers
- Payment receipt for initial registration in the programme

Upon registration, the students will be provided with the following facilities

- Access to Postgraduate Learning Management System (PGVLE) which provides access to course materials, past papers, quizzes, assignments, discussion forums, etc.
- Access to UCSC Library facility
- WiFi access
- A Student ID Card
- A Student Handbook

Registration Process

At the commencement of academic activities of each semester, the postgraduate division performs the following tasks;

- Organizing the inauguration ceremony and the Orientation Programme for the new intake
- Preparation and publishing of the Academic Calendar in the PGVLE
- Obtaining the approval from the Senate for the course Rubric and Examiners of the courses of each degree programme.
- Creating the LMS Instance for the courses of each programme in consultation with the E-learning Centre, UCSC.
- Updating the VLE regularly in consultation with the e-Learning Centre (i.e. weekly time table, academic calendars, special notices etc.)
- Reserving and arranging Lecture Halls /Labs for lectures in consultation with Academic & Publication Division and Network Operating Centre
- Preparation and publishing of weekly lecture timetable in the VLE in consultation with the examiners and programme coordinators
- Preparation, distribution and collection of weekly Attendance Sheets.
- Preparation and publishing the semester end exam timetable in consultation with Examination Division
- Facilitating the Examination Division to conduct the semester examinations.
- Facilitating student in submitting assignments/project reports
- Facilitating students in forwarding their requests/queries/appeals related to academic activities at the Board of Study/Research and Higher Degrees with the recommendation of relevant Programme/ Project Coordinators.
- Informing the decisions made at the BOS/RHD, Academic Syndicate, to the relevant students.
- Facilitating Project Coordinators to evaluate master's Dissertations by:
    - Collecting monthly progress reports
    - Collecting and distributing interim reports.
    - Collecting and distributing final project reports.
    - Conducting final Viva
- Issuing studentship certification letters requested by students
- Facilitating students to select optional courses of semester III and IV of MCS/ MSc in CS/ MIT/ MBAnalytics Degree Programmes using the prescribed forms

- Collecting student feedback at the end of each semester in consultation with the Quality Assurance Cell with the aim of improving the future delivery of the course based on suggestions/feedback
- Facilitating foreign students for VISA arrangements
- Canducting pear review of lecturers in each semester

Thesis/Dissertation and VIVA

At the end of the 4th semester, a student who undertook a project work should submit a Thesis/ Dissertation for the final examination. Upon the submission of the Thesis/ Dissertation, the student shall be called for a presentation and an oral examination which will be assessed by a panel of examiners.

The postgraduate division facilitates the evaluation process of the thesis/dissertation in consultation with the dissertation coordinators of each programme.

The division facilitates the students to submit their requests/queries/appeals related to thesis/dissertation activities to the Board of Study/Research and Higher Degrees (BOS/RHD) with the recommendation of the relevant supervisor and coordinators of the Thesis/ Dissertation.

Repeat students

The postgraduate division facilitates the repeat students to complete the degree within the maximum period of 04 years from his/ her initial registration to the programme by:

- Registering in the relevant academic year upon the payment of the prescribed fees as follows (fees given below are subject to change as per the approved budget of each academic year)

Studentship Renewal Fee	Rs. 20,000/=
LMS Fee	Rs. 1,000/=
Project/ Independent Study Repeat Fee	Rs. 20,000/=
Repeat Examination Fee	Rs. 2,500/= [should be paid upon the notification from the Examination Division]

Student Requests

The division facilitates the students to submit their requests/queries/appeals related to academic activities of the programme to the Board of Study/Research and Higher Degrees (BOS/RHD) with the recommendation of relevant Programme/ Dissertation Coordinators.

The students who have been absent at the semester examinations are eligible to retake the examination in the next available opportunity of the subject after paying the prescribed fees within the maximum period of validity (four academic years including the first period of registration) of the degree.

If a student resists examination for a course, the highest marks scored for such courses will be taken into consideration in the computation of GPA for the award of the Degree.

In mitigating conditions the student should submit an appeal with documentary evidence for his/her absence at the examination to the BOS/RHD within 07 working days from the examination date. It is not essential to submit an appeal for absence for an examination unless the student wishes that he/she be considered for the Distinction as per the Bylaws Section 14 (2).

The BOS/RHD shall normally consider the requests under the following two categories;

1. Under Exceptional Circumstances (EC):
    - Grants within the registered period of validity (04 years)
    - Considered only under medical conditions of the immediate family or similar personal circumstance with documentary evidence acceptable to the BOS/RHD
    - Recommendation from the relevant coordinator

2. Under Grace Chance:
    - Grace Chance is granted to complete the degree beyond the maximum period of validity (i.e. 04 years) subject to acceptable documentary evidence and recommendation of the relevant Programme Coordinator and the Senior Assistant Registrar/Examination on the possibility of completing the degree in the given grace period.
    - A maximum of one year grace period will be granted.
    - Grades obtained within the grace period are not considered for Merit or Distinction Passes.
    - Grades of the deferred years will be marked as “absent” in the transcript.

06

Our Team

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Department of Computation and Intelligent Systems



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Department of Information Systems Engineering



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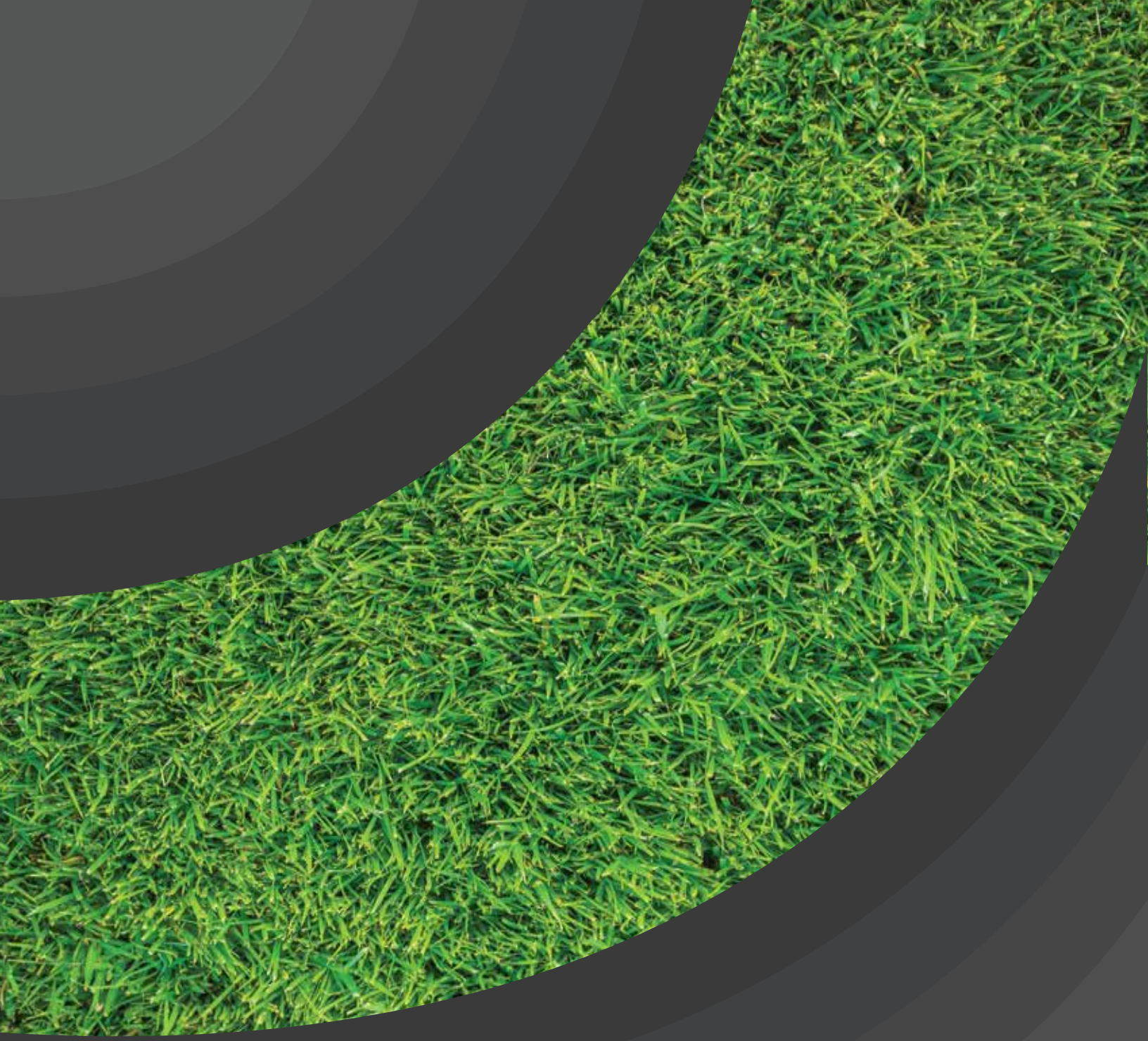
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