University of Colombo School of Computing







MASTERS' HANDBOOK 2025



University of Colombo School of Computing

MASTERS' STUDENT HANDBOOK 2025

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 March, 2025.

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 Education, Advancing the Frontiers of Knowledge through Teaching, Learning and Research.

Mission

To advance and enhance computing studies, fostering international relations and collaborations, promoting cross-disciplinary research, producing socially responsible scholars with entrepreneurial skills, leadership qualities and integrity contributing to the national goal of promoting the country as the knowledge hub in the region.



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MESSAGE FROM THE VICE CHANCELLOR



I am indeed pleased to pen my thoughts on the Occasion of printing the Masters Handbook 2025, compiled for students following the Master of Science in Computer Science, Master of Computer Science, Master of Information Technology, Master of Information Security, Master of Cybersecurity and Master of Business Analytics degree programs by the University Of Colombo School Of Computing. I am certain this handbook that details all required information for new entrants of the UCSC, will be very helpful for all the registrants.

The Institute of Computer Technology (ICT), the predecessor of the UCSC was established in the year 1987. With subsequent developments in information and communication technology IT education in Sri Lanka was eagerly awaited. The need for a fully fledged higher educational institute teaching IT and communication related subjects were championed by visionaries and policy makers of our University. A multitude of intellectual inputs with unending discussions led to the establishment of the University of Colombo School of Computing in 2002, replacing the then Department of Statistics and Computer Science. The current academic staff led by Director Dr. D.A.S.Atukorale of the UCSC, is aptly qualified with doctoral degrees from highly recognized universities and hold fellowships and memberships from world renowned professional associations to be the excellent trainers they are.

The Master Degree programme at UCSC is the epitome of a golden opportunity for obtaining a globally recognized pioneering degree from the oldest University in Sri Lanka. I will be failing in my duty, if I do not mention the legendary late Professor V K Samaranayake, without whose services and dedicated contributions; none of what we experience today at UCSC would be a reality. I am happy to note that the UCSC at present has become the much sought after institution for IT education in Sri Lanka.

This publication will provide the new entrants with up to date information about your seat of learning. A handbook is always useful not only to the students but to those who wish to have an in-depth knowledge of the activities of the school including the operational mechanism of both academic and administrative spheres. As students of this University I hope you will derive the optimal benefits from the treasure trove of opportunities you will discover, broaden your horizons and help make each and every one of you the responsible experts of our beautiful country.

Once again I extend my best wishes to you for a rewarding experience at the University of Colombo!

Senior Professor H D Karunaratne
Vice Chancellor,
University of Colombo

MESSAGE FROM THE DIRECTOR



On behalf of the University of Colombo School of Computing (UCSC), it is my great pleasure to welcome you to the Master's Degree Programme for the academic year 2025. Postgraduate studies in computing at UCSC are among the most significant academic offerings we manage under the University of Colombo in the field of Computing. These programmes have a distinguished history of nearly three decades, consistently setting the benchmark for computing education in Sri Lanka.

UCSC has earned its reputation as the leading computing higher education institution in the country, driven by the dedication of our highly qualified academic staff, including over 30 senior lecturers with doctoral-level expertise. Every member of our academic and non-academic staff is committed to nurturing and supporting our students, ensuring they receive the highest quality education. Our strong industry connections and esteemed academic standing have facilitated exceptional career opportunities for our graduates. Additionally, our well-established research groups, recognized internationally, contribute to the advancement of computing knowledge. Our curriculum aligns with ACM-IEEE standards, ensuring that our graduates are equipped with globally relevant competencies.

The Master's Degree Programme is designed for Computing graduates seeking to enhance their knowledge and gain a prestigious postgraduate qualification from a leading metropolitan university. It serves as a pathway for both professional advancement and future research opportunities in the field.

As a center of excellence in higher education, UCSC remains committed to fostering an environment that supports our vision and mission. Our strategic focus is on maintaining the highest academic standards, developing well-rounded graduates, and enhancing their employability.

On behalf of UCSC, I extend my best wishes for a successful academic journey. We look forward to supporting you as you embark on this new chapter in your higher education.

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.

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01

Introduction



College House

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 ten faculties, one school (University of Colombo School of Computing), six 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 ten Faculties, a Campus, a School and six Institutes. 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 Indigenous Medicine



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
≈1000+
STUDENTS
01
EXTERNAL DEGREE
≈ 5000
STUDENTS
06
MASTERS DEGREES
≈ 450
STUDENTS
02
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

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 science in Information Technology, Master of science in Computer Science, Master of science in 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

MILESTONES OF COMPUTING AT 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



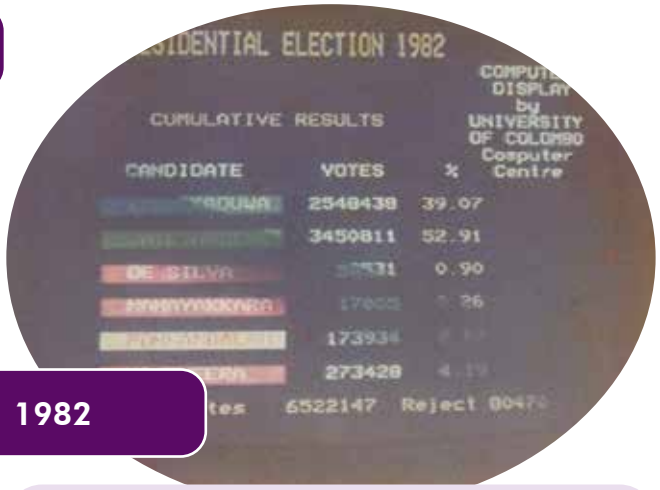
1981

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 institutio

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)

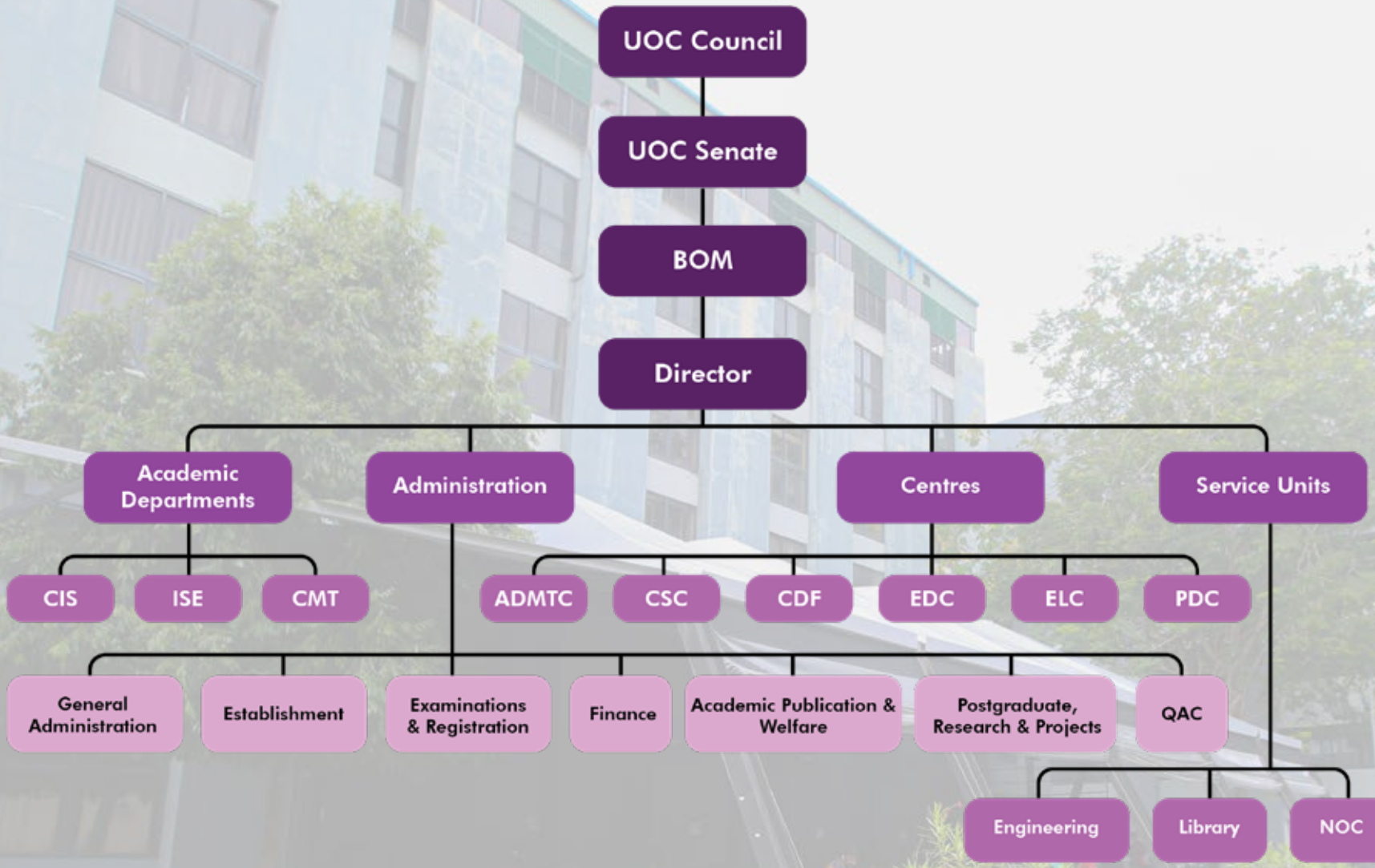


Figure 1: Administration and Operational Units

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.



02

Research Groups

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.



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.

SYSRES - SYSTEM RESEARCH GROUP

Dr. D A S Atukorale

System Research Group (SysRes) is a research group at UCSC dedicated to exploring the fascinating realms of operating systems, and, computer networks. Our primary focus is on advancing the understanding and development of efficient and reliable systems that power modern computing infrastructures. Within our group, we delve into cutting-edge topics, seeking to improve system performance, security, and scalability. Our members actively engage in both theoretical and practical investigations, utilizing state-of-the-art methodologies and tools to push the boundaries of knowledge in these areas. Collaborating with industry partners and academia, we seek to apply our findings to real-world scenarios, ultimately enhancing the overall computing experience for users worldwide.

LANGUAGE TECHNOLOGY RESEARCH LABORATORY (LTRL)

Dr. B H R Pushpananda

Language Technology Research Laboratory (LTRL) was established in 2004 to address the growing need of local language computing in Sri Lanka by conducting Localization and Language Processing research and development. The LTRL conducts research in the field of computational linguistics: phonetics/phonology, morphology,and syntax of local languages, Text Understanding & Generation: Machine Translation, Text Summarization, Question Answering, Speech & Multimodal Processing: Automatic Speech Recognition and Text to Speech. These research studies primarily focus on local languages, namely Sinhala and Tamil. The research group has a diverse range of activities: Research & Development, Consultancy, Training and Services. Most of the research-based applications developed by LTRL are available for access on the website: www.subasa.lk.

SYNERGY RESEARCH GROUP

Mr. R J Amaraweera

Research Team : Mr. Rangana Jayashanka (Principal Investigator), Dr. Kasun Karunanayaka, Mr. Upul Anuradha

The Synergy Research Group is dedicated to applying the body of knowledge in computer science to solve problems across various domains, including Medicine, Education, Agriculture, and Environmental Sciences. Our focus lies in key areas such as Machine Learning, Data Analytics, Data Visualization, Human-Computer Interaction, Technology for Development, and Learning Analytics.

MODELLING & SIMULATION GROUP

Dr. K D Sandaruwan

The Modeling and Simulation Research Group, established in 2009, specializes in computer-based mathematical, graphical, and algorithmic representations of real-world systems. The group excels in Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR), with deployed applications in the Sri Lanka Navy, Army, Air Force, Port Authority, Ministry of Fisheries, and Ocean University. Key projects include Vidusayoura (ship-handling simulator), Siyara VTMS (3D vessel traffic monitoring), and the Field Artillery Simulation System (military training).

The group has received many awards such as e-Swabhimani, APICTA, and NBQSA, published over 100 research papers, and secured national and international grants. It continues to drive cutting-edge technological solutions for national development. Expanding its expertise, the group is now venturing into sports biomechanics, analysis, and visualization to enhance performance and injury prevention.

INTERDISCIPLINARY MOLECULAR COMMUNICATION AND SENSING RESEARCH GROUP (IMCS)

Dr. Asanka P Sayakkara

The Interdisciplinary Molecular Communication and Sensing Research Group is exploring the communication and sensing technologies at the molecular level. Our work spans over the fields of biology, chemistry, computer science, and engineering, with a focus on understanding how molecules can be employed for communication and sensing applications. Through interdisciplinary collaboration, we strive to pioneer breakthroughs that have the potential to impact diverse fields, from healthcare to environmental monitoring.

AI IN EDUCATION RESEARCH GROUP

Prof. K P Hewagamage

The AI in Education Research group in UCSC conducts research on enhancing the quality of education by applying latest developments of AI. Our research mainly focuses on harnessing the power of Generative AI and Large Language Models to develop interactive, high quality educational chatbots.

Students often struggle with new subjects, requiring personalized support to prevent disengagement. However, traditional teaching assistant ratios in large courses limit their ability to provide timely assistance. Despite global trends towards digital solutions, Sri Lankan Higher Education Institutes have not fully utilized Conversational AI for round-the-clock student services. To address this issue, we have developed a Teaching Assistant Bot (TA BOT) for a Software Engineering course which is available on https://chat.ucsc.cmb.ac.lk/ for experimentation.



EDUSMART RESEARCH GROUP

Dr. (Ms.) T A Weerasinghe

The research group EduSmart was formed to provide better support to lifelong learners through a smart learning environment, enabling learning and assessment to be more exciting and engaging.

The group aims to expand services that can support learning and development through online learning platforms, which can track its learners' progress and provide personalized support. To achieve this aim, the group will investigate research fields such as learning analytics, educational data mining, and interaction design.



CloudNET (ECloud ML)

Dr. (Ms.) Dinuni Fernando

CloudNet Research Lab is dedicated to the realms of cloud computing and virtualization, with a specific emphasis on enhancing the performance of secure live migration of virtual machines. We explore innovative methods to elevate the efficiency and security of live virtual machine migration and fault tolerance. As a subgroup, further our ECloudML Education based machine learning research group was established in 2021 with diverse and multi disciplinary research work spread across education, machine learning and cloud domain. ECloudML collaborates with natural science research groups around the globe to conduct multi disciplinary machine learning based projects.



THE COGNITIVE SYSTEMS AND TIME SERIES (CoTS) RESEARCH GROUP

Dr. M I E Wickramasinghe

The Cognitive Systems and Time Series (CoTS) research group explores the relationship between human cognition and analyzing time-dependent data. Cognitive systems refer to developing computational models and algorithms that mimic human cognitive processes such as perception, learning, reasoning, and decision-making. Moreover, time-series research analyses data collected over time to uncover patterns, trends, and dependencies. We integrate cognitive models with time series methods to analyze and interpret complex temporal data to make sense of complex time series data, leading to improved decision-making, forecasting, and understanding of dynamic processes in various domains.



MINDSYS - MIND SYSTEMS RESEARCH GROUP

Dr. H E M H B Ekanayake

Established in November 2023, the MindSys Research Group at the University of Colombo School of Computing is an interdisciplinary team dedicated to exploring mind systems at the intersection of philosophy, science, and technology. They emphasize a unique blend of insight and innovation, pushing the boundaries of cognitive science using computing technologies. Notably, the group integrates Eastern philosophical insights, particularly from Buddhism, into the Western philosophical framework, creating a holistic approach. Their research spans philosophical inquiries into consciousness, rigorous scientific investigations of human cognition, and the use of cutting-edge computational modeling, simulations, machine learning, and artificial intelligence. MindSys is committed to unraveling fundamental aspects of human cognition, including learning, perception, decision-making, behavior, and intelligence.



UCSC SPATIAL EXPERIENCE AND HUMAN-COMPUTER INTERACTION (USE-HCI) RESEARCH GROUP

Mr. R M U A Rathnayake

The USE-HCI research lab is an interdisciplinary research lab working to invent the future of technology. The vision of the lab is to design, build and enhance innovative technologies to solve real-world problems. To this end, the USE-HCI Lab aims to develop technology solutions to address community-driven problems by bringing together an interdisciplinary set of people to share ideas and collaborate on research related to the interaction between design, people, and technology.

TRANSFORMERS RESEARCH GROUP

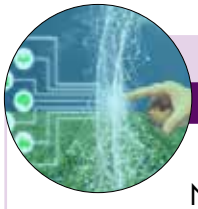
Dr. (Ms.) S M K D Arunatileka

The eTransformation Research Group typically focuses on studying the impact, implications, and evolution of digital technologies on various aspects of society and industries for social good and benefit. This group explores how digital transformations influence different domains, seeking to understand the challenges, opportunities, and changes brought about by the adoption of digital technologies.

GEOMATICS - GIS RESEARCH GROUP

Dr. (Ms.) Enosha Hettiarachchi

GeoMatics is a GIS research group at the UCSC dedicated to pushing the boundaries of geospatial technologies by addressing current limitations and developing innovative solutions across various domains. Our objectives encompass the development and implementation of cutting-edge methodologies for spatial analysis in areas like urban planning, environmental science, public health, disaster management, and natural resource management. We advocate for the widespread use of GIS in decision-making processes, emphasizing the importance of open-source software and data accessibility for research and development. Collaborative interdisciplinary efforts are encouraged, fostering partnerships between professionals and students from diverse fields such as Geography, Computer Science, Environmental Science, Public Health, and Engineering. Through knowledge sharing, capacity building, and a supportive research environment.



AGROTECH RESEARCH GROUP

Prof. K P Hewagamage

The AgroTech research group was established in 2023 to address the identification of Nitrogen(N) requirement which is one of the crucial problems engaged in the agriculture sector and help farmers to make actionable decisions. The objective of our research is to generate ICT based cost effective solutions in determining the Nitrogen based fertilizer requirement in paddy cultivation. To this end, the group explores the new techniques to manage agricultural data and knowledge and investigates the applicability of emerging technologies such as artificial intelligence, human computer interaction, data analytics and drones in Agri-tech to make actionable decisions.



MLDAG RSEARCH GROUP

Mr. G P Seneviratne

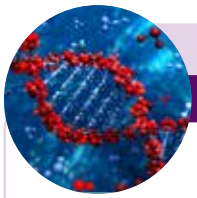
'ML and Data Analytics for Good is a forward-thinking research group that combines the power of machine learning, data analytics, and a deep understanding of agro and transportation systems to drive positive change in society. We are dedicated to harnessing the potential of data-driven insights to address complex challenges and improve the lives of individuals and communities worldwide. Our multidisciplinary approach focuses on leveraging advanced ML techniques and analytics to optimize agricultural practices, enhance crop yield, promote sustainable farming methods, and mitigate the impact of climate change on food production.



MIXED REALITY LAB

Dr. K A K T Karunanayake

The Mixed Reality Lab (MXR) aims to push the boundaries of research into interactive new media technologies through the combination of science, engineering, art, and creativity. The aim of the lab is to invent the future through the visualization and realization of new media research. This continues the tradition established at Xerox PARC, Disney Imagineering, and the MIT Media Lab and by visionary individuals such as Douglas Englebart, Alan Kay, Brendan Laurel and Jaron Lanier. The key objectives of the Mixed Reality Lab are as follows: create a center of excellence for interactive media and entertainment technology, provide a multi-disciplinary research environment for students, propose new technologies to promote sustainable development, and develop new assistive technologies for children and the elderly.



BIOSYS RESEARCH GROUP

Dr. (Ms.) M W A C R Wijesinghe

The Bioinformatics and Systems Biology (BioSys) research group in the UCSC conducts interdisciplinary research at the interface of Computer and Biological Sciences. Members of the group are from various sub domains including machine learning, bioinformatics, life science, high performance computing and statistics. Our research primarily involves conducting quantitative studies such as pattern recognition and network analysis to discover biological knowledge; and developing computational techniques, algorithms, tools and statistical models to analyze various biological data and to make predictions on them.



ELEPIDYNAMICS RESEARCH GROUP

Dr. P V K G Gunawardana

'ElephIDynamics,' dedicated to the cause of wildlife conservation and the mitigation of human-elephant conflict in Sri Lanka. The primary focus of the group is on leveraging Machine Learning techniques for elephant identification using photographic images to accurately identify elephants, which is pivotal in comprehending their movements and population dynamics.

C4SA - SUSTAINABLE AGRICULTURE RESEARCH GROUP

Dr. (Ms.) L N C De Silva

The "Computing for Sustainable Agriculture (C4SA)" research group focuses on using advanced computing technologies to promote sustainability in agriculture practices. By analyzing vast amounts of agricultural data through data analytics, machine learning, and artificial intelligence techniques, the group provides farmers and agricultural stakeholders with actionable information and decision support tools to improve productivity and sustainability across the agricultural value chain. Through close collaboration with industry partners, government agencies, and academic institutions, the group aims to translate research findings into practical solutions that address real-world challenges faced by farmers and agricultural communities, driving innovation and fostering sustainable practices that ensure food security, environmental stewardship, and economic prosperity for present and future generations.

DavLaB: PIONEERING DATA-DRIVEN INSIGHTS ACROSS DISCIPLINES

Dr. S S P Mathara Arachchi

DavLab is an innovative research group dedicated to advancing the frontiers of data science through experimental research in data mining, data analytics, machine learning, and digital signal processing. Our multidisciplinary approach leverages cross-sectional quantitative data to uncover insights across diverse domains, including health informatics, plant diversity, and human behavior.

At DavLab, we focus on developing and applying cutting-edge analytical techniques to address complex real-world challenges. By integrating sophisticated algorithms with robust data-driven methodologies, our team strives to contribute meaningful solutions that enhance decision-making, foster innovation, and promote sustainable practices. Our work not only bridges the gap between theory and application but also aims to drive impactful outcomes across scientific, technological, and societal landscapes.

03

Postgraduate Education

3.1

Master of Computer Science/ Master of Science in Computer Science

MASTER OF COMPUTER SCIENCE/MASTER OF SCIENCE IN COMPUTER SCIENCE

The first ever Computer Science Masters programme in Sri Lanka was launched by the University of Colombo in 1990, while Computing was taught at Undergraduate level by the University of Colombo since 1967. The Masters level teaching grew ever since to the current state, and has evolved into multiple masters programs today. The Master of Computer Science (MCS) programme is aimed at expanding the theoretical foundation and technical skills of professionals who are in the software industry and academia. The programme consists of both the course work and a dissertation spanning into 2 years. The students who excel in the first two semesters of the MCS programme are provided an opportunity to upgrade themselves to the Master of Science in Computer Science (MSc in CS) which includes an advanced research-focused dissertation work.

DURATION

MCS/MSc in CS: 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 Bachelor's Degree in Computing from a University or Institution recognized bythe University Grants Commission and/or the University of Colombo; OR

(b) A Bachelor's Degree in Science with Computing as a major subject from a University or Institution recognized by the University Grants Commission and/or the University of Colombo; OR

(c) A Bachelor's Degree in Electronics Engineering or Telecommunications Engineering from a University or Institution recognized by the University Grants Commission and/or the University of Colombo; OR

(c) Any other academic or professional qualification deemed equivalent to a Bachelor's Degree in Computing by the Senate of the University of Colombo on the recommendation of the relevant board of studies of the School. Each application under this category shall be considered on a case-by-case basis; AND

(d) Attaining the minimum performance score in a selection test, such as General Computing Competency Test (GCCT); AND

(e) Fulfilling additional prerequisites such as an interview, availability of vacancies, and payment of the requisite fees.

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 01

Code	Title	Credits	Compulsory / Optional
MCS1301	Advanced Algorithms	03	C
MCS1302	Research Methods	03	C
MCS1303	Advanced Database Systems	02	C
MCS1304	Advanced Data Communications Networks	03	C
MCS1305	Advanced Software Engineering	02	C

MCS1301 - Advanced Algorithms

This course module explores key techniques for solving complex computational problems. Topics include asymptotic analysis, time complexity, and solving recurrences, along with tractable and intractable problems. Students will study string matching algorithms (Naïve, Boyer-Moore, KMP, Rabin-Karp), dynamic programming, greedy strategies, and graph algorithms such as shortest paths, minimum spanning trees, and vertex cover problems. The course also covers randomized algorithms, including Monte Carlo and Las Vegas approaches. Through theoretical analysis and hands-on implementation, students will develop a deep understanding of algorithmic efficiency and optimization.

MCS1302 - Research Methods

This course module provides a comprehensive foundation in conducting rigorous academic research. It covers the scientific method, research philosophies (e.g., positivism, interpretivism, pragmatism), and approaches to theory development (induction, deduction, abduction). Students will learn to define research problems, formulate research aims and questions, and conduct systematic literature reviews using proper referencing styles. The course explores research strategies such as experiments, case studies, surveys, and ethnography, along with method choices, time horizons, and ensuring credibility. Ethical considerations, research integrity, and the process of publishing are also emphasized, equipping students with essential skills for high-quality academic and professional research.

MCS1303 - Advanced Database Systems

This course module explores core principles and emerging trends in modern database management. Topics include database integrity, transaction management, recovery, concurrency control, and distributed databases. Students will examine query processing techniques, optimistic concurrency control, and advanced data models such as object-relational databases. The course also covers emerging technologies, including data warehousing, XML and internet databases, and evolving trends in database systems. Through theoretical analysis and hands-on implementation, students will develop expertise in designing, optimizing, and managing complex database environments for diverse applications.

MCS1304 - Advanced Data Communications Networks

This course module provides an in-depth exploration of modern networking principles, protocols, and emerging technologies. It covers channel characterization, the TCP/IP stack, IP addressing, and support protocols. Students will examine multi-access protocols (CSMA, FDMA, TDMA), routing strategies (IPv6, OSPF, BGP, MPLS, multicast, DHT), and end-to-end issues such as TCP congestion control and QoS. The course also delves into data center design, virtualization, SDN concepts, and advanced networking paradigms, including CDMA, MANETs, IoT, and vehicular networks. Practical experience with network simulation tools (NS, Mininet) and discussions on emerging trends prepare students for cutting-edge network research and development.

MCS1305 - Advanced Software Engineering

This course module explores modern software development challenges, methodologies, and best practices. It covers the evolution of software development models, requirement engineering, and industry-standard unified process models. Students will study object-oriented modeling, software architecture, refactoring, and design patterns, along with software reuse and component-based engineering. The course also delves into code quality, empirical and open-source software engineering, and the impact of social and agile practices. Advanced tools such as code analyzers, clone detectors, and static/dynamic analysis techniques are explored. Emerging trends prepare students for cutting-edge research and innovation in software engineering.

SEMESTER 02

Code	Title	Credits	Compulsory / Optional
MCS2301	Principles of Programming Languages	02	C
MCS2302	Information Systems Security	02	C
MCS2303	Machine Learning	03	C
MCS2304	Advanced Operating Systems	03	C
MCS2305	High Performance Computing	02	C

MCS2301 - Principles of Programming Languages

This course module provides a comprehensive study of programming language design, implementation, and evaluation. It covers language implementation methods, syntax and semantics, lexical and syntax analysis, and key concepts such as data types, bindings, type checking, and scope. Students will explore expressions, control statements, subprograms, and object-oriented language features, along with exception handling and event-driven programming. The course introduces lambda calculus and functional programming fundamentals while examining emerging trends in language design. Through theoretical analysis and practical exploration, students will gain a deep understanding of language paradigms and their impact on software development.

MCS2302 - Information Systems Security

This course module provides a comprehensive understanding of security principles, cryptographic techniques, and system protection mechanisms. It covers hash algorithms, symmetric and asymmetric encryption systems, key management protocols, and Java cryptography. Students will explore network, web, and email security, along with secure operating systems, databases, and software applications. The course also examines legal aspects of cybersecurity and emerging trends in information security. Through theoretical foundations and practical implementations, students will develop the skills to analyze, design, and implement secure information systems.

MCS2303 - Machine Learning

This course module provides a comprehensive introduction to fundamental concepts, algorithms, and applications of machine learning. It covers supervised and unsupervised learning, model evaluation, feature selection, and optimization techniques. Students will explore key algorithms such as decision trees, support vector machines, neural networks, and clustering methods, along with deep learning fundamentals. The course also addresses practical challenges, including overfitting, bias-variance tradeoff, and scalability. Through hands-on implementation and real-world case studies, students will develop the skills to design, train, and evaluate machine learning models for various applications. Emerging trends in AI and ML research are also discussed.

MCS2304 - Advanced Operating Systems

The Advanced Operating Systems module explores the design, implementation, and optimization of modern operating systems. Topics include process synchronization, concurrency control, memory management, file systems, and advanced scheduling techniques. Students will study distributed and real-time operating systems, virtualization, security mechanisms, and fault tolerance. The course also covers system performance analysis, resource allocation strategies, and emerging trends in OS research. Through theoretical concepts and hands-on projects, students will develop a deep understanding of complex OS architectures and their role in high-performance computing environments.

MCS2305 - High Performance Computing

This course module focuses on the principles and techniques used to achieve high computational performance in complex applications. Topics include parallel programming, multi-core and distributed computing, cluster and grid computing, GPU programming, and performance optimization strategies. Students will explore algorithms and data structures tailored for high-performance environments, along with techniques for load balancing, memory hierarchy optimization, and scalable computing. The course also covers emerging trends in exascale computing and computational resource management. Through hands-on exercises and case studies, students will gain practical experience in designing and implementing high-performance computing solutions for scientific and engineering problems.

SEMESTER 03

Code	Title	Credits	Compulsory / Optional
MCS3301	Data Warehousing and Mining	03	O
MCS3302	Computer Graphics and Image Processing	03	O
MCS3303	Theoretical Computing	02	O
MCS3304	Natural Language Processing	02	O
MCS3305	Human Computer Interaction	02	O
MCS3306*	Individual Research Project	07	C*
MCS3307**	Individual Project	02	C**

* **MCS3306** is compulsory and offered only to the Master of Science Degree Programme. It spans two semesters with a total credit value of 15.

** **MCS3307** is compulsory and offered only to the Masters Degree Programme. It spans two semesters with a total credit value of 5.

MCS3301 - Data Warehousing and Mining

This course module provides a deep dive into the concepts, techniques, and tools used to extract valuable insights from large datasets. It covers data warehousing concepts, including data modeling, ETL processes, and the design of data warehouses. Students will explore data mining algorithms for classification, clustering, regression, and association rule mining, along with techniques for pattern recognition and anomaly detection. The course also addresses data preprocessing, dimensionality reduction, and the application of mining techniques to real-world problems. Through practical implementations and case studies, students will develop the skills to design, build, and analyze data warehousing and mining systems for business intelligence and decision-making.

MCS3302 - Computer Graphics and Image Processing

This course module explores the principles and techniques used to create, manipulate, and analyze digital images and graphics. Topics include 2D and 3D graphics rendering, geometric transformations, raster and vector graphics, and animation techniques. Students will study image processing techniques such as filtering, enhancement, compression, and segmentation, as well as computer vision fundamentals. The course also covers algorithms for object recognition, feature extraction, and image-based rendering. Through hands-on projects and case studies, students will gain practical experience in developing and optimizing graphics and image processing applications for various fields such as entertainment, healthcare, and engineering.

MCS3303 - Theoretical Computing

This course module provides a rigorous foundation in the mathematical and conceptual aspects of computation. It covers key topics such as formal languages, recursive definitions, regular sets, regular expressions, and finite state automata (DFA and NFA), along with their equivalence and minimization techniques. Students will explore context-free grammars (CFG), pushdown automata (PDA), and the complexities of ambiguity and normal forms in CFGs. The course also delves into Turing machines, decidability, and the Church-Turing thesis, addressing decision problems, the halting problem, and reducibility. Through these topics, students will gain an in-depth understanding of computational theory, including the decidability of language problems and the foundational limits of computation.

MCS3304 - Natural Language Processing

This course module explores the computational techniques used to process and analyze human language. Topics include text preprocessing, tokenization, part-of-speech tagging, syntactic parsing, and named entity recognition. Students will study advanced NLP methods such as word embeddings, topic modeling, machine translation, and sentiment analysis. The course also covers machine learning approaches for NLP tasks, including supervised and unsupervised learning, as well as deep learning models like recurrent neural networks (RNNs) and transformers. Through practical projects and case studies, students will develop the skills to build and evaluate NLP systems for real-world applications in areas such as search engines, chatbots, and automated translation.

MCS3305 - Human Computer Interaction

This course module focuses on the design, evaluation, and implementation of user-friendly interfaces between humans and computers. Topics include usability principles, user-centered design, and methods for conducting user research and testing. Students will explore interaction techniques, such as graphical user interfaces (GUIs), voice recognition, and gesture-based controls, along with the impact of design on user experience (UX). The course also covers accessibility, cognitive load, and designing for diverse user groups. Through hands-on projects and case studies, students will gain practical experience in creating effective, intuitive, and inclusive interfaces for a wide range of devices and applications.

MCS3306 - Individual Research Project

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 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.

MCS3307 - Individual Project

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.

SEMESTER 04

Code	Title	Credits	Compulsory / Optional
MCS4301	Systems Modelling & Simulation	03	O
MCS4302	Mobile Computing	03	O
MCS4303	Distributed Systems	02	O
MCS4304	Computer Vision	02	O
MCS4305	Embedded Systems	02	O
MCS4306	Selected Topics in Computer Science	02	O
MCS3306*	Individual Research Project	08	C*
MCS3307**	Individual Project	03	C**

* **MCS3306** is compulsory and offered only to the Master of Science Degree Programme. It spans two semesters with a total credit value of 15.

** **MCS3307** is compulsory and offered only to the Masters Degree Programme. It spans two semesters with a total credit value of 5.

MCS4301 - Systems Modelling & Simulation

This course module introduces students to the theory and practical techniques for modeling and simulating complex systems. Topics include deterministic systems, focusing on the use of difference and differential equations and their numerical solutions, as well as stochastic systems involving probability distributions, random variables, and Markov chains. Students will explore Monte Carlo simulations, discrete-time vs. discrete event simulations, and cellular automata as tools for system analysis. The course also covers the use of simulation software to model real-world systems and analyze their behavior. Through hands-on projects, students will develop the skills to design, implement, and evaluate simulations for a variety of applications in engineering, business, and science.

MCS4302 - Mobile Computing

This course module focuses on the development and implementation of mobile applications for wireless devices. Topics include mobile operating systems, with an emphasis on Android, and the anatomy of mobile apps, including the app lifecycle. Students will learn to develop applications using Android Studio, covering the Android user interface, intents, persistence, WebView, and web services. The course also explores 2D graphics, location-based apps, and mobile sensors. Additionally, students will gain experience in hybrid mobile app development (Ionic), native mobile app development (React Native), and mobile testing. Mobile security concepts, including tools like Bouncy Castle and Spongycastle, and emerging trends in mobile computing are also addressed. Through practical projects, students will gain hands-on experience in creating secure, high-performance mobile applications.

MCS4303 - Distributed Systems

This course module provides an in-depth exploration of the design, implementation, and analysis of distributed systems. Topics include fundamental concepts such as coordination, agreement, and fault tolerance, with a focus on leader election, consensus algorithms, Byzantine Fault Tolerance (BFT), and blockchain as a ledger consensus mechanism. Students will study atomic commit protocols, logical and vector clocks, as well as broadcasting methods like RBCAST, URBCAST, and ABCAST. The course also covers specialized middleware systems, including Cassandra, Zookeeper, and Spanner, and streaming technologies like Pub/Sub. Additionally, students will learn about parallel computing models such as SIMD, MIMD, Amdahl's Law, MPI, OpenMP, and GPU computing. Through practical projects and case studies, students will develop the skills to design, optimize, and evaluate scalable, fault-tolerant distributed systems, with a focus on emerging trends in the field.

MCS4304 - Computer Vision

This course module focuses on the computational techniques used to enable machines to interpret and understand visual data from the world. Topics include image processing, feature extraction, edge detection, and object recognition. Students will explore machine learning and deep learning methods, such as convolutional neural networks (CNNs), for image classification, segmentation, and detection tasks. The course also covers 3D vision, motion analysis, camera calibration, and tracking. Additionally, students will study applications of computer vision in real-world domains like autonomous vehicles, facial recognition, and medical imaging. Through hands-on projects and case studies, students will gain practical experience in implementing and evaluating computer vision algorithms and models.

MCS4305 - Embedded Systems

This course module provides an in-depth study of designing and programming embedded systems, with a focus on AVR microcontrollers. Topics include low-level programming techniques, on-board communication protocols like UART, SPI, and I2C, and their application in real-world systems. Students will also explore low-power wireless communication protocols, such as IEEE 802.15.4 and LoRa, and how to integrate these into embedded applications. The course covers the design and development of embedded software, hardware interfacing, and optimization techniques for energy efficiency and real-time performance. Through hands-on projects, students will gain practical experience in developing embedded systems for applications in IoT, robotics, and other fields.

MCS4306 - Selected Topics in Computer Science

This course module provides a focused exploration of advanced and emerging areas in the field of computer science. The course offers flexibility in its content, covering topics such as machine learning, artificial intelligence, quantum computing, cybersecurity, and advanced algorithms, depending on current trends and research interests. Students will engage with cutting-edge theories, technologies, and applications, and will have opportunities to explore specific areas in depth through readings, and discussions. This course is designed to encourage critical thinking, foster research skills, and equip students with the knowledge needed to tackle complex challenges in the rapidly evolving landscape of computer science.

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:

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.

$$GPA = \frac{\sum (GPV_i \times Credit_i)}{\sum Credit_i}$$

Where: GPV_i is the Grade Point Value for each course (on a scale from 0 to 4.25).
$Credit_i$ is the number of credit hours associated with each course.
$\sum$ denotes the sum over all the courses in the degree program entitled to the student.

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 performance in Master of Computer Science
- Award for the best performance in Master of Science in Computer Science.

REPEATING A COURSE/ SUBJECT

- A student is allowed to retake the examination of a course at the next available opportunity. When a course examination is retaken, the highest grade achieved shall be considered for the computation of results for the award of the degree.

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

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 (the GPA is calculated for courses adding up to a minimum of 25 Credits using the best grades);

MINIMUM REQUIREMENT TO OBTAIN A DEGREE

The Master of Computer Science

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 30 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 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 45 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 Project.

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.

3.2

Master of Information Technology

MASTER OF INFORMATION TECHNOLOGY

The Master of Information Technology (MIT) programme is especially designed for graduates from non-computing disciplines who aspire to enter the IT industry. Originally offered as an MSc in Information Technology from 2002 to 2004, the programme was reintroduced in 2007 with a focus on equipping individuals with limited computing knowledge for IT-related careers. The curriculum, revised in 2017 and most recently in 2025, keeps pace with advancements in the field. Covering key areas such as programming, software engineering, cybersecurity, data analysis, and AI/ML, the MIT programme prepares graduates for diverse roles, including software development, network administration, and IT management. With over 13 batches graduated by 2024, it continues to be a gateway for professionals looking to excel in the evolving tech landscape.

DURATION

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

LECTURES

Lectures and practicals are conducted in weekends from 8.30 am to 5.45 pm.

ENTRY QUALIFICATIONS

a) A Bachelor's 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 Bachelor's Degree by the Senate of the University of Colombo on the recommendation of the school. Provided that, each such application under the category shall be considered on a case-by-case basis; **And**
c) Meeting all additinal requirements as specified in the applicable by-laws and regulations.

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
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 program consists of multiple courses, each carrying a specified number of credits. All courses in the first and second semesters are compulsory, while the third and fourth semesters include both compulsory and optional courses. Module descriptors for each course are available on PGVLE. To obtain the degree, students must complete the required courses and meet the minimum conditions outlined in the relevant By-Laws and Regulations.

The Course Codes, Titles, Credits and their Standing in each Semester are as follows:

SEMESTER 01

Code	Title	Credits	Compulsory / Optional
MIT1301	Program Design and Programming	3	C
MIT1302	Computer Systems	2	C
MIT1303	Database Management Systems	3	C
MIT1304	Data Communications and Computer Networks	3	C
MIT1305	Mathematics and Statistics for IT	2	C

MIT1301 - Program Design and Programming

This course introduces the fundamentals of program design and programming, focusing on the Python programming language. It aims to equip students with essential programming skills and a strong foundation in problem-solving techniques, enabling them to tackle computational tasks across various domains. The course begins with an introduction to programming concepts and Python syntax, progressing through more complex topics like object-oriented programming (OOP), data structures, and file handling. Additionally, students will learn how to work with databases and explore Python's extensive ecosystem of modules, libraries, and packages.

MIT1302 - Computer Systems

The Computer Systems course introduces students to the fundamental components of computer systems, covering both hardware and software aspects that work together to run software applications. This module spans the essential concepts, from the CPU architecture, basics of logic circuits, number representation and machine language to the organization and management of memory and the implementation of programming languages. Students will explore the complete range of abstractions, from low-level hardware to high-level programming, gaining an understanding of how computers operate at all levels. By the end of the course, students will be equipped to approach software development from a system-oriented perspective, enhancing their ability to create efficient and effective applications.

MIT1303 - Database Management Systems

This course covers foundational and advanced topics in Database Management Systems. It commences with an exploration of the historical evolution and critical role of Database Management Systems (DBMS). The curriculum progresses through the Relational Data Model, Entity-Relationship (ER) concepts, and logical design principles, with a focus on normalization processes. Structured Query Language (SQL) is thoroughly covered, encompassing basic operations, advanced querying, and optimization techniques. The course culminates in an examination of emerging trends, including NoSQL databases and cloud-based services. Practical sessions, assessments, and projects ensure a comprehensive understanding, preparing students for proficient database design and management in diverse IT landscapes.

MIT1304 - Data Communications and Computer Networks

This course aims to delve into the fundamentals of data communication and transmission, computer network architecture, and channel access methods. Participants will explore the intricacies of the Internet's structure, gain a deep understanding of the TCP/IP protocol suite, and master IP addressing, subnetting, routing, and multicasting. The course offers a forward-looking perspective by introducing IPv6 and covers the nuances of transport layer protocols, including TCP and UDP. Additionally, students will explore application layer protocols, such as HTTP and FTP, and delve into the realm of wireless local area networks (WLANs) with a focus on IEEE 802.11 standards. Practical elements include hands-on labs, assignments, and a group project, ensuring participants graduate with a robust skill set for designing, implementing, and managing modern computer networks. Industry insights, guest lectures, and real-world case studies further enhance the course, preparing students for the dynamic landscape of information technology and networking.

MIT1305 - Mathematics and Statistics for IT

This course provides a comprehensive exploration of foundational mathematical concepts and statistical methods tailored to the field of Information Technology. Beginning with an introduction to mathematical structures, the course delves into linear algebra's practical applications in computer graphics and IT systems. Discrete mathematics introduces algorithms, logic, and probability, setting the stage for a detailed examination of statistics, covering data representation, probability distributions, and hypothesis testing. Advanced statistical techniques, including analysis of variance and correlation/regression analysis, are integrated, offering a robust statistical toolkit. The course then shifts focus to Operational Research, presenting problem-solving approaches such as the graphical method, simplex method, and addressing transportation and assignment problems. Additionally, students gain hands-on experience with statistical software tools, enhancing their ability to analyze and visualize data in an IT context. The final weeks culminate in a comprehensive project where students synthesize their knowledge, applying mathematical and statistical methodologies to address real-world IT challenges. Through a blend of theoretical understanding and practical application, the course equips students with a solid mathematical and statistical foundation essential for making informed decisions and solving complex problems in the dynamic realm of Information Technology.

SEMESTER 02

Code	Title	Credits	Compulsory / Optional
MIT2301	Software Engineering	2	C
MIT2302	Data and Network Security	2	C
MIT2303	UI/UX Design	2	C
MIT2304	Web and Mobile Development	3	C
MIT2305	Artificial Intelligence	3	C

MIT2301 - Software Engineering

This course explores key principles and practices in software development. Beginning with an introduction to the historical evolution of software engineering and the crucial role of software engineers, the course delves into essential software quality attributes and examines various software development processes, including traditional models like the Waterfall and innovative approaches such as Agile and Prototyping. Emphasis is placed on Requirement Analysis and Specification, equipping students with skills in eliciting, documenting, and managing changing requirements. The course then progresses into Software Design, covering design principles, architectural patterns (MVC, Repository, Client-Server), and design patterns. Practical aspects of coding, coding practices, code reviews, and walkthroughs are explored, fostering the development of robust coding skills. Testing strategies and maintenance, integral to the software development life cycle, are thoroughly examined, alongside project management principles and quality management practices. Throughout the course, students engage in hands-on projects, applying learned concepts to real-world scenarios, and ultimately, emerge with a deep understanding of software engineering, proficient in designing, coding, testing, and managing software projects effectively.

MIT2302 - Data and Network Security

This course is designed to equip students with a thorough understanding of the fundamental principles and practical applications of securing digital information. The course begins with an exploration of data and network security concepts, addressing various threats and introducing policies and best practices. Subsequent weeks delve into the realm of cryptography, covering hash algorithms, symmetric and asymmetric key encryption, and key management protocols. Operating system and database security are then examined, emphasizing access controls, encryption, and secure coding practices. The course delves into program security, focusing on secure coding, testing methodologies, and application security frameworks. Topics like secure electronic mail, authentication protocols, and network security technologies are explored to provide students with a robust understanding of securing communication channels and network infrastructure. The course concludes with a focus on web security, encompassing SSL/TLS protocols and legal considerations in the realm of data and network security. Throughout the program, students engage in hands-on labs, case studies, and real-world applications to reinforce theoretical knowledge with practical skills essential for addressing contemporary challenges in the field.

MIT2303 - UI/UX Design

This course introduces students to the principles and practices of UI/UX design within the broader context of Human-Computer Interaction (HCI). It covers the cognitive aspects of user behavior, effective user interface development, and modern design methodologies. Students will learn how to design user-friendly interfaces, conduct usability testing, and build functional prototypes. The course emphasizes real-world applications through case studies, interactive lectures, and practical assignments. By the end of the course, students will be equipped to create user-centered designs and evaluate their effectiveness using various methods.

MIT2304 - Web and Mobile Development

This course immerses students in a holistic journey through the intricacies of contemporary web and mobile application development. Commencing with the fundamental elements of web technologies, students delve into client-side development, mastering HTML, CSS, and JavaScript, before progressing to server-side programming using PHP and MySQL. The course seamlessly transitions to web hosting essentials and explores solution stacks, 3-tier architecture, and web server intricacies. The mobile development segment introduces students to the intricacies of operating systems for wireless mobile devices, Android app anatomy, and the Android development environment. In-depth coverage of Android UI, intents, persistence, and web services paves the way for advanced topics like animation, graphics, location-based applications, sensing, and sensors. The course encompasses hybrid and native mobile app development, mobile testing strategies, and security considerations. The final weeks culminate in a comprehensive project, allowing students to synthesize their skills and knowledge into practical applications, fostering a well-rounded skill set essential for a successful career in web and mobile development.

MIT2305 - Artificial Intelligence

This course provides a comprehensive introduction to Artificial Intelligence (AI), covering foundational concepts and advanced techniques. Students will explore machine learning paradigms, including supervised and unsupervised learning, neural networks, support vector machines, and reinforcement learning. The curriculum emphasizes learning theory, model evaluation, and ethical considerations, ensuring a balanced understanding of both technical and societal aspects. Advanced topics like Boltzmann Machines and Bayesian statistics are introduced, alongside practical applications in robotics, data mining, autonomous navigation, and bioinformatics. Through hands-on labs and programming assignments, students will apply AI techniques using tools like Python and TensorFlow. The course concludes with discussions on future trends, such as explainable AI and federated learning, preparing students to navigate the evolving AI landscape with both expertise and ethical awareness.

SEMESTER 03

Code	Title	Credits	Compulsory / Optional
MIT3301	IT Project Management and Professional Issues	2	C
MIT3302	Platform Technologies	2	C
MIT3303	E-Learning Concepts and Technologies	2	O
MIT3304	Data Mining for Business Intelligence	2	O

MIT3301 - IT Project Management and Professional Issues

This course equips participants with the skills to identify and address ethical issues using established frameworks while providing a comprehensive understanding of how to manage IT projects effectively. By integrating ethical considerations into project management, participants will be better prepared to navigate complex challenges in their professional environments. The course is divided into two main parts: Professional Issues and Project Management. In the Professional Issues section, we will explore how to identify ethical issues in the workplace and address them using established ethical theories and codes of conduct, equipping participants with the skills to navigate ethical dilemmas effectively. The second part focuses on managing IT projects, beginning with identifying the business case for a project, which serves as the foundation for successful project management, followed by an exploration of essential project management processes to ensure participants are well-prepared to handle various aspects of project execution and delivery.

MIT3302 - Platform Technologies

The Platform Technologies course offers an in-depth exploration of the foundational systems and frameworks that support modern computing environments. Students will gain comprehensive knowledge of various platform technologies, including operating systems, cloud computing, virtualization, and distributed systems. The course covers the architecture, design, and implementation of these technologies, with a focus on how they enable the development, deployment, and management of software applications in diverse environments. Throughout the course, students will examine the principles and practices that underlie platform technologies, such as resource management, security, scalability, and fault tolerance. Emphasis will be placed on understanding the interplay between hardware and software layers, as well as the impact of emerging trends such as containerization, microservices, and serverless computing. Hands-on labs and projects will allow students to apply their knowledge by working with real-world platforms, configuring environments, and optimizing performance. Case studies will provide insights into how leading companies leverage platform technologies to drive innovation and maintain competitive advantage. By the end of the course, students will be equipped with the skills to evaluate, select, and implement platform technologies in various contexts, preparing them for roles in IT infrastructure, software development, and systems engineering.

MIT3303 - E-Learning Concepts and Technologies

This course provides an in-depth exploration of e-learning concepts, theories, and technologies essential for modern education and training environments. Students will gain a robust understanding of learning theories such as Behaviorism, Cognitivism and Constructivism, and their application to e-learning. The course covers key technologies and tools that drive current e-learning practices, offering a comparative analysis of various platforms. The course emphasizes the planning and management of e-learning projects employing methodologies such as Scrum and Iterative Waterfall. The students will learn to evaluate e-learning effectiveness through metrics and feedback mechanisms to ensure continuous improvement. In the design and development module, students will delve into instructional system development methodologies like ADDIE and SAM, creating engaging multimedia content and incorporating interactive elements. The course covers best practices for delivering online learning courses through learning support systems such as LMS and LXP and integrating them with other related systems for human capacity development. Emerging trends such as Artificial Intelligence and Virtual and Augmented Reality are explored, providing insights into future innovations in e-learning. Practical applications are emphasized through hands-on development activities and analysis of real-world case studies, allowing students to apply theoretical knowledge to practical scenarios. The course also addresses professional and ethical issues in e-learning, including copyrights, intellectual property rights, and industry standards. By the end of the course, students will be equipped with the skills and knowledge to design, manage, and innovate in e-learning environments, preparing them for future challenges and opportunities in the field.

MIT3304 - Data Mining for Business Intelligence

This course provides a comprehensive exploration of data mining techniques and their applications in business intelligence. Students will begin with foundational concepts, including the importance of data mining and its role within the broader scope of data warehousing and OLAP systems. Key topics include data preprocessing techniques essential for preparing raw data for analysis, and methods for representing and interpreting mining results. The course delves into a variety of data mining algorithms, focusing on classification techniques such as decision trees, random forests, and support vector machines, as well as clustering methods like K-Means and DBSCAN. Students will learn to evaluate model performance using metrics such as accuracy, precision, recall, and AUC, and explore advanced techniques like association rule mining, text mining, and anomaly detection. Emerging trends in the field, including big data analytics, real-time mining, and the integration of AI and deep learning, will be discussed. The course emphasizes practical applications through hands-on projects using real business data, enabling students to apply theoretical knowledge to real-world scenarios. By the end of the course, students will gain the skills necessary to effectively use data mining tools and techniques to derive actionable insights, making them well-prepared for careers in data science, business analysis, and related fields.

SEMESTER 04

Code	Title	Credits	Compulsory / Optional
MIT4301	Independent Study	5	C
MIT4302	Software Quality Assurance	2	C
MIT4303	e-Business Applications and Strategies	2	O
MIT4304	Multimedia and Graphic Design	2	O

MIT4301 - Independent Study

In the Fourth Semester of the Master's Degree Programme, students are required to undertake an Independent Study, a comprehensive project designed to deepen their understanding of a selected topic and demonstrate their practical and analytical skills. This course provides an opportunity for students to explore a unique topic of their choice, guided by a dedicated Supervisor. Students will begin by selecting a topic from a list compiled by the Course Coordinator, sourced from Supervisor recommendations. The Supervisor will mentor each student, aiding in topic selection, resource acquisition, critical thinking, and analysis through regular meetings to ensure progress and address challenges. The core deliverables of the course include a Self-Reflection Report/Portfolio and a practical Application demonstration. The Self-Reflection Report must showcase the student's proficiency in problem-solving methodologies, systematic information presentation, and data analysis. It should reflect their ability to apply theoretical knowledge to practical situations by developing, implementing, and proposing solutions to real-world problems. The Application demonstration, accompanied by inline code verification and progress evidence through a source code repository, is integral to the assessment. This course is pivotal in demonstrating students' capacity to conduct independent research and apply their learning to practical scenarios.

MIT4302 - Software Quality Assurance

The Software Quality Assurance course provides an in-depth exploration of the principles, methodologies, and tools essential for ensuring high-quality software products. Designed for MIT degree candidates, this course covers the entire lifecycle of software quality assurance, from pre-project planning to maintenance and continuous improvement. Students will delve into key quality factors, including reliability, usability, and maintainability, and explore industry standards and certification processes. The course emphasizes both theoretical and practical aspects, starting with foundational software quality concepts and progressing to hands-on experience with advanced tools and techniques. Topics include software testing strategies, test case design, defect management, and the use of automation tools such as Selenium and TestNG. Students will also learn about mobile application testing with Appium and gain insights into continuous integration and build tools like Jenkins and GitLab CI. Students will engage in group projects to apply their knowledge in real-world scenarios. The course concludes with an examination of emerging trends in quality assurance, such as AI-driven testing and quality assurance in Agile and DevOps environments. By the end of the course, students will be equipped with a comprehensive understanding of software quality assurance practices and be prepared to implement effective strategies in various software development contexts.

MIT4303 - e-Business Applications and Strategies

This course provides an in-depth exploration of the dynamic field of e-Business, focusing on the integration of technology and strategy to drive business success in the digital age. Students will gain a comprehensive understanding of the e-Business environment, including key trends, technologies, and competitive strategies shaping the industry. The course covers essential topics such as e-Business application development tools, enabling students to design and implement effective digital solutions. Emphasis is placed on e-Customer Relationship Management (e-CRM), where students will learn to leverage CRM systems to enhance customer interactions and satisfaction. E-Procurement and supply chain management are examined to understand how digital tools streamline procurement processes and improve supply chain efficiency. The course also delves into electronic payment systems, exploring various methods and technologies for secure and efficient transactions. Security in e-Business is a critical focus, with students learning to address risks, protect assets, and ensure compliance with relevant regulations. e-Marketing strategies are covered, equipping students with the skills to develop and execute successful digital marketing campaigns. Legal and ethical considerations in e-Business are addressed, including data privacy, intellectual property, and corporate responsibility. The course concludes with a look at future directions in e-Business, exploring emerging technologies and trends that will shape the industry's future. Practical projects and case studies provide hands-on experience, allowing students to apply theoretical knowledge to real-world scenarios. By the end of the course, students will be well-equipped to navigate the complexities of e-Business and drive strategic growth in a digital landscape.

MIT4304 - Multimedia and Graphic Design

The course is designed to provide learners with a comprehensive understanding of modern graphics design and multimedia production techniques, emphasizing cutting-edge tools and emerging trends. The course balances foundational principles with hands-on practice, enabling participants to develop both creative and technical expertise.

Participants will delve into 2D design concepts, exploring color theory, typography, and vector-based graphics using industry-standard software such as Adobe Illustrator. The course transitions into 3D design, covering essential modeling techniques, texturing, lighting, and rendering using tools like Blender and Maya. Learners will explore advanced topics, including procedural modeling, particle systems, and real-time physics simulations, to create visually compelling and realistic 3D content. In line with current trends, the course introduces AI-powered tools for design automation and generative media creation. Learners will also explore immersive media design for virtual and augmented reality, developing interactive experiences with platforms like Unity or Unreal Engine. Motion graphics and visual effects are integral components, focusing on keyframe animation, compositing, and dynamic simulations.

Throughout the course, participants will gain insights into industry advancements, such as real-time rendering, the metaverse, and cloud-based collaboration. The program culminates in a portfolio-building session, where learners showcase their multimedia projects, preparing them for professional opportunities in gaming, animation, and interactive media. By the end of this course, participants will be proficient in designing 2D/3D graphics, leveraging emerging technologies, and creating interactive multimedia experiences. Whether pursuing careers in design, gaming, or immersive media, learners will leave equipped with the skills to thrive in the evolving digital landscape.

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:

Range of Marks, 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,CN	0.00

NC - Not Complete, CN - Cancelled

*Note: The examination branch of the School may use additional status codes such as NA (Not Applicable), WH (Withheld), and AB (Absent) to represent the intermediate status of student results.

Computation of Grade Point Average (GPA)

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

$$GPA = \frac{\sum (GPV_i \times Credit_i)}{\sum Credit_i}$$

Where: GPV_i is the Grade Point Value for each course (on a scale from 0 to 4.25).
$Credit_i$ is the number of credit hours associated with each course.
$\sum$ denotes the sum over all the courses in the degree program entitled to the student.

ACADEMIC EXCELLENCE AWARDS

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

Graduation Awards (Awarded at the Convocation)

- JICA award for the best performance in Master of Information Technology

REPEATING A COURSE/ SUBJECT

- A student is allowed to retake the examination of a course at the next available opportunity. When a course examination is retaken, the highest grade achieved shall be considered for the computation of results for the award of the degree.

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

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 (the GPA is calculated for courses adding up to a minimum of 25 Credits using the best grades);

MINIMUM REQUIREMENT TO OBTAIN A DEGREE

1) The minimum conditions which a student shall satisfy for the award of the Master of Information Technology shall be as follows:
   a) obtained not lower than C grade (GPV of 2.00) in the Courses which make up a minimum of 30 Credits
   b) obtained not less than a GPA of 2.00 for all the Courses which make up a minimum of 40 Credits; and
   c) obtained not less than a C Grade (Pass) for the Independent Study.
2) Once the relevant Board of Study has decided to award the Degree, the student is no longer eligible to continue the Programme, and all pending results shall be rendered null and void.
3) No student shall be entitled to the award of the Master of Information Technology unless such student has satisfied all other relevant requirements and such student has supplicated for the award of the Master's Degree at the relevant Convocation of the University.

Note: As a fallback option, students who meets the conditions specified in the relevant By-Laws or Regulations may choose to obtain a Postgraduate Diploma.

3.3

Master of Information Security

MASTER OF INFORMATION SECURITY

The Master of Information Security program is designed for graduates seeking advanced knowledge and expertise in information security. This program covers a broad spectrum of topics, equipping students with the necessary skills to protect digital assets, manage security threats, and ensure compliance with security standards. The curriculum offers a diverse range of subjects within the information security domain, providing both theoretical foundations and practical applications. Additionally, students have the opportunity to engage in research, allowing them to explore emerging challenges and innovations in the field. Upon successful completion, graduates will be well-prepared for careers in cybersecurity, incident response and threat management, cloud and network security, digital forensics and cybercrime investigation, information systems auditing, and research and academia. This program serves as a strong foundation for professionals aiming to contribute to the rapidly evolving information security landscape.

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 Bachelor's 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 01

Code	Title	Credits	Compulsory / Optional
MIS1201	Principles of Information Security	3	C
MIS1202	Cryptographic Systems	3	C
MIS1203	Information Risk Management and Audit	2	C
MIS1204	Network Security	3	C
MIS1205	Special Topics in Information Security*	2	C

MIS1201 - Principles of Information Security

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

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

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

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 *

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 02

Code	Title	Credits	Compulsory / Optional
MIS2201	Database Security	3	C
MIS2202	Digital Forensics	3	C
MIS2203	Security in Mobile and Wireless Networks	3	C
MIS2204	Data Mining for Information Security	3	C

MIS2201 - Database Security

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

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

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

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 03

Code	Title	Credits	Compulsory / Optional
MIS3201	Information and Coding Theory	2	C
MIS3202	Secure Software Systems	3	C
MIS3203	Information Security Governance	2	C
MIS3204	Incident Management	2	C
MIS3205	Individual Project	5	C

MIS3201 - Information and Coding Theory

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

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

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

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

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 04

Code	Title	Credits	Compulsory / Optional
MIS4201	Cyber Security and Law	3	C
MIS4202	Multimedia Security and Digital Rights Management	3	C
MIS4203	Independent Studies in Information Security	5	C

MIS4201 - Cyber Security and Law

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

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

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.

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:

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

- Asiriyal de Zoysa memorial award for the best performance in Master of Information Security

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

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 ;

MINIMUM REQUIREMENT TO OBTAIN A DEGREE

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.

3.4

Master of Business Analytics

MASTER OF BUSINESS ANALYTICS

The Master of Business Analytics (MBAnalytics) program at the University of Colombo School of Computing (UCSC) was launched in 2018 to address the growing demand for professionals in data science and business analytics both locally and globally. Designed as a two-year, postgraduate program, it equips students with analytical and computational skills to tackle complex business challenges through data-driven decision-making. The curriculum covers key areas such as business statistics, data programming, machine learning, data mining, and information visualization, blending theoretical foundations with practical applications. Since its inception, three cohorts have successfully graduated as of 2024, further strengthening the industry's pool of skilled data scientists.

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 Bachelor's 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 01

Code	Title	Credits	Compulsory / Optional
BA1001	Business Statistics	3	C
BA1002	Organizational Data Management	2	C
BA1003	Fundamentals of Data Science and Business Analytics	2	C
BA1004	Data Programming	3	C

BA1001 - Business Statistics

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

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

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

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 02

Code	Title	Credits	Compulsory / Optional
BA2001	Statistical Inference for Analytics	3	C
BA2002	Machine Learning and Pattern Recognition	3	C
BA2003	Data Warehousing and Mining	3	C
BA2004	Information Visualization	3	C
BA2005	Technical Writing		C

BA2001 - Statistical Inference for Analytics

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

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

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

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 03

Code	Title	Credits	Compulsory / Optional
BA3001	Modelling and Simulation of Data	3	C
BA3002	Predictive Analytics	3	C
BA3003	Computational Social Science	3	C
BA3004	Applied Optimization + (Not offered for 2024/25 Intake)	3	O
BA3005	Open Source Intelligence + (Not offered for 2024/25 Intake)	3	O
BA3006	Text Analytics +	3	O
BA3007	Individual Project **	5	O

BA3001 - Modelling and Simulation of Data

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

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

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.

BA3004 - Applied Optimization + (Not offered for 2024/25 Intake)

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 2024/25 Intake)

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 +

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 **

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 04

Code	Title	Credits	Compulsory / Optional
BA4001	Big Data Analytics ^	2	O
BA4002	Analytics for Process Improvement ^	2	O
BA4003	Intelligent Agents in Gaming ^ (Not offered for 2024/25 Intake)	2	O
BA4004	Confidential Information and Legal Regime	2	C
BA4005	Independent Studies in Business Analytics	5	O

BA4001 - Big Data Analytics ^

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 ^

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 2024/25 Intake)

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.

BA4004 - Confidential Information and Legal Regime

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***

BA4005 - Independent Studies in Business Analytics

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.

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:

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

- Prof. G.N. Wikramanayake memorial award for the best performance in Master of Business Analytics

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

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;

MINIMUM REQUIREMENT TO OBTAIN A DEGREE

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.

3.5

Master of Cybersecurity

MASTER OF CYBERSECURITY

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.

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 Bachelor's 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 01

Code	Title	Credits	Compulsory / Optional
MC1001	Principles of Cybersecurity	3	C
MC1002	Cryptographic Systems	3	C
MC1003	Network protocols and standards	2	C
MC1004	Network Design	3	C
MC1005	Special Themes in Cybersecurity*	2	C

MC1001 - Principles of Cybersecurity

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

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

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

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*

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 02

Code	Title	Credits	Compulsory / Optional
MC2001	Database Security	3	C
MC2002	Software Vulnerability Analysis	3	C
MC2003	Network Security	3	C
MC2004	Security in Mobile and Wireless Networks	3	C

MC2001 - Database Security

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

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

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

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 03

Code	Title	Credits	Compulsory / Optional
MC3001	Digital Forensic	3	C
MC3002	Cybercrime and Legal Regime	2	C
MC3003	Open Source intelligence	3	C
MC3004	Incident Response Management	2	C
MC3005	Technical Writing		C

MC3001 - Digital Forensic

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

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

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

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 04

Code	Title	Credits	Compulsory / Optional
MC4001	Information Security Audit	2	C
MC4002	Network Troubleshooting	3	C
MC4003	Independent Studies in Cybersecurity	5	C

MC4001 - Information Security Audit

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

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

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.

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:

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 performance 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

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;

MINIMUM REQUIREMENT TO OBTAIN A DEGREE

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.

04

General Guidelines

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
B.Sc. (Hons), PhD (UCD, Dublin), (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)



Independent Study Coordinator

Dr. (Ms.) M W A C R Wijesinghe
B.Sc. (Pdn), PG Dip (Col), M.Sc. (Col), M.Phil. (Col), PhD (Col)

MASTER OF INFORMATION SECURITY



Programme Coordinator

Mr. P K M Thilakarathne
BIT (Col), MPhil (Col)



Project Coordinator

Mr. T N B Wijethilaka
BIT(Col), MSc in CS(Col), MCSSL, MBCS

MASTER OF BUSINESS ANALYTICS



Programme Coordinator

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Project Coordinator

Mr. R J Amaraweera
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MASTER OF CYBERSECURITY



Programme Coordinator

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Project Coordinator

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(E105 UCSC BUILDING)



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Trainee

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Works Aide

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EXAMINATIONS DIVISION
(W107, UCSC BUILDING)



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Assistant Registrar

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Staff Management Assistant

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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
Address	Postgraduate Division, UCSC, No. 35, Reid Avenue, Colombo 07, Sri Lanka.

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

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

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 (fees given below are subject to change as per the approved budget of each academic year)

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.

***Note**: Only applicable to Master of Information Security, Master of Business Analytics and Master of Cybersecurity

05

Our Team

OFFICIALS

DIRECTOR



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B.Sc. (Col), PhD (Queensland), MIEEE, MCSSL

DEPUTY DIRECTOR



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HEADS OF DEPARTMENTS

Department of Communication and Media Technologies



Prof. T N K De Zoysa
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Department of Computation and Intelligent Systems



Mr. W V Welgama
B.Sc. (Col), M.Phil. (Col)

Department of Information Systems Engineering



Dr. C I Keppitiyagama
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ACADEMIC STAFF

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Mr. P Marasinghe (On Leave)
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