Master in Computer Science

ASU
جامعة العلوم التطبيقية
APPLIED SCIENCE UNIVERSITY

Programme Coordinator:
Dr. Ahmed Jedidi

Office Number:
+973 16036256

Email:
ahmed.jedidi@asu.edu.bh

Head of Department:
Dr. Oualid Ali

Office Number:
+973 16036143

Email:
oualid.ali@asu.edu.bh

Apply Now | Enquiry | Study Plan

Programme Details

Final Qualification	Language of Study	Mode of Study
Master Degree	English	Full Time

Programme Structure

Study Period	Total Credit Hours	Number of Courses
2 Years	36 Credit Hours	11 Courses

Brief about the Programme

QS WORLD UNIVERSITY RANKINGS 2025 BY SUBJECT (601- 650) COMPUTER SCIENCE & INFORMATION SYSTEMS

Advance your career with our master in computer science, offering specialized tracks in Artificial Intelligence and Cyber Security. Designed according to modern academic and industry standards, the programme provides advanced knowledge and practical skills in Artificial Intelligence (AI), machine/deep learning, data analytics, business intelligence, and computer security.

Students may choose between an applied project or a research thesis to align their studies with their career goals. Upon completion, graduates earn a reputable qualification that strengthens their competitiveness in today's competitive job market.

Aims of the Programme

1. Provide graduates with critical knowledge of specialized theories, issues, and current methods in computer science and scientific research. This expertise will enable them to effectively contribute to qualitative professional and societal development within an environment characterized by rapid change and ambiguity.
2. Prepare graduates who can apply current theories, methods, and specialized scientific research techniques to conduct advanced studies and research. They will investigate complex computer science-related problems in the business environment and devise creative solutions.
3. Develop graduates critical thinking and analytical skills in computer science, enabling the interpretation and creative evaluation of new situations and problems to effectively assist business enterprises in formulating and implementing relevant computer science-related strategies.
4. Enable graduates to apply professional-level skills in unpredictable and ambiguous work environments and to communicate effectively, collaborate in teams, and uphold a strong sense of responsibility toward colleagues and stakeholders.

The first university in the Kingdom of Bahrain to achieve global accreditation from the British Quality Assurance Agency for Higher Education (QAA)

Rated 5 Stars in the QS Rating System

Ranked 30th in the QS Arab Region University Rankings 2026

Ranked 613 in the QS World University Rankings 2026

Ranked 301+ Worldwide in the Times Higher Education University Impact Rankings

Career Paths

1. AI/ML Specialist
2. Cybersecurity Manager
3. Data Scientist
4. Cloud Solutions Architect
5. Software Development Manager
6. Blockchain Specialist
7. Systems Architect
8. IT Consultant
9. Research Scientist in CS
10. University Lecturer

Entry Requirements

1. The applicant must hold a bachelor's degree or its equivalent from a university or college recognized by the Ministry of Education in the Kingdom of Bahrain.
2. The applicant's bachelor's degree must be in the same or a closely related qualifying field as the master's programme, as defined by the study plan. Otherwise, the student must successfully complete a number of remedial courses approved by the University and specified by the concerned department.
3. The applicant should be the holder of a bachelor's degree with a GPA of not less than 'Good' or its equivalent to be admitted.
4. Applicants with a GPA less than 'Good' have the chance to be admitted conditionally given they have a one year of experience or be given some remedial courses in case of absence of the work experience.
5. Applicants who do not meet the admission requirements may be granted conditional admission with remedial courses selected by the department and as per the university graduate studies bylaws.
6. Transfer students are accepted as per the Article 17 of the university graduate studies bylaws.
7. The applicant should pass an interview conducted by a committee in the Academic Department.
8. The applicant must pass the University›s English placement test or submit a TOEFL score of 500 or equivalent. Applicants who do not meet this requirement must commit to successfully completing a mandatory English remedial course prescribed by the college within their first year of study.

Study Plan

This degree required from the student to complete 36 CH in one of two options thesis or applied project

First Year – First Semester (9 Credit Hours)			
Course Code	**Course Title**	**Credit Hours**	**Prerequisite**
MCS691	Scientific Research Methodology	3	-
MCS611	Advanced Analysis and Design of Algorithms	3	-
MCS612	Advanced Database Systems	3	-
First Year – Second Semester (9 Credit Hours)			
Course Code	**Course Title**	**Credit Hours**	**Prerequisite**
MCS613	Advanced Operating Systems	3	-
MCS624	Advanced Artificial Intelligence	3	-
MCS631	Advanced Computer Networks	3	-

Second Year: Option 1 Applied Project

Second Year – First Semester (9 Credit Hours)			
Course Code	**Course Title**	**Credit Hours**	**Prerequisite**
MCS625	Data Driven Decision Making	3	-
MCS642	Cybersecurity	3	-
-	Elective Course 1	3	-
Second Year – second Semester (9 Credit Hours)			
Course Code	**Course Title**	**Credit Hours**	**Prerequisite**
-	Elective Course 2	3	-
MCS698	Applied Project	6	MCS691 + Pass 75% of the study plan courses

Second Year: Option 2 Thesis

Second Year – First Semester (9 Credit Hours)			
Course Code	**Course Title**	**Credit Hours**	**Prerequisite**
MCS642	Cybersecurity	3	-
-	Elective Course 1	3	-
-	Elective Course 2	3	-
Second Year – second Semester (9 Credit Hours)			
Course Code	**Course Title**	**Credit Hours**	**Prerequisite**
MCS699	Thesis	9	MCS691 + Pass 75% of the study plan courses

Programme Elective Courses

Course Code	Course Title	Credit Hours	Prerequisite
MCS614	Advanced Software Engineering	3	
MCS621	Big Data Analytics	3	
MCS622	Data Mining and Analysis	3	
MCS623	Machine Learning	3	
MCS632	Cloud Computing and Internet of Things	3	
MCS643	Advanced Cryptography and Network Security	3	
MCS692	Selected Topics in Computer Science	3	Dept Approval

Course Description

MCS611 -Advanced Analysis and Design of Algorithms

This course introduces students to advanced algorithms analysis and design techniques used in Computer Science. The course is designed to provide students with a solid foundation in conceptual and formal models, efficiency, and levels of abstraction as used in the field of Computer Science.

MCS612 - Advanced Database Systems

This course covers advanced aspects of database management systems including advanced normalization and denormalization, Database recovery, object-oriented and object-relational databases, concurrency control, transaction management, data integration (e.g., semi structured data and XML). Students will undertake a semester project that involves the design and implementation of a database system.

MCS613 - Advanced Operating Systems

This course is designed to introduce students to advanced topics in standard, embedded and cloud operating systems. Topics include operating systems architecture, processes, threads, concurrency, memory management, file management, scheduling, embedded operating systems, operating systems security, IoT and cloud operating systems.

MCS614- Advanced Software Engineering

This course is designed to provide the student with the critical knowledge and professional skills needed for software requirements engineering, design, implementation and testing and to cover advanced theoretical concepts in software engineering including: software reuse, component-based software engineering, distributed software engineering, service-oriented architecture, embedded software and aspect-oriented software engineering. The course involves hands-on experience in dealing with various issues in software development.

MCS621- Big Data Analytics

This course covers advanced data science and big data analytics methodologies and technologies. The course emphasizes systems and algorithms for largescale advanced data processing and introduce the characteristics and challenges of the Big Data, state-of-the-art computing paradigms and platforms. The course covers: The data analytics lifecycle, fundamental and sophisticated analytics approaches, and developing big data technology, big data programming tools (e.g., Hadoop and MongoDB), big data extraction and integration, big data storage, scalable indexing for big data, big graph processing, big

data stream techniques and algorithms, big probabilistic data management, big data privacy, big data visualizations, and big data applications (e.g., spatial, finance, multimedia, medical, health, and social data).

MCS622 - Data Mining and analysis

This course provides students with critical knowledge and understanding of Data Mining algorithms. This course covers the theoretical and practical aspects in data mining. It includes some of topics are: Introduction to Data Mining, data preprocessing and cleaning, visualization, classification, clustering, association, using different statistical and machine learning techniques, current research in data mining and applications in data mining.

MCS623 - Machine Learning

Machine Learning is a method to discover and predict some unobserved components and concerned with the data construction and its relationships. This course provides students with a detailed knowledge on machine Learning concepts in supervised and unsupervised learning, various machine learning techniques Regression and Statistical Models, Classification, Clustering, Decision Trees, Neural Networks, Bayesian Networks, Convolutional neural networks and Deep Learning , Support vector machine , Reinforcement Learning, Evolutionary computing in machine learning, Particle Swarm Intelligence techniques and latest researches in Machine Learning.

MCS624 - Advanced Artificial Intelligence

This course is designed to introduce students to advanced topics in Artificial Intelligence. Topics include reasoning under uncertainty, AI programming, machine learning, making simple and complex decisions, and natural language processing.

MCS631 - Advanced Computer Networks

This course is designed to provide the student with critical knowledge and professional skills to be a follow-up module to the advanced computer networks. This course will cover application layer protocols, Internet protocols, transport layer services and protocols, IP addressing, traffic analysis, flow and congestion control algorithms, Routing algorithms, internetworking, MPLS networking technology, security, network performance, Quality of Service and current topics of research and development. This course will cover the practical aspects of computer networks, with emphasis on the layers protocols, IP addressing and Routing.

Course Description

MCS632 - Cloud Computing and Internet of Things

This course includes IoT topics: IoT Network Architecture and Design, Smart Objects: The "Things" in IoT, Connecting Smart Objects, IP as the IoT Network Layer, Application Protocols for IoT. As well as this course includes the cloud computing topics: fundamental cloud computing, cloud computing mechanisms, cloud computing architecture, working with clouds and latest search in IoT and cloud computing.

MCS642- Cyber Security

This course is designed to provide the student with the critical knowledge and professional skills needed for Cyber Security. The topics are Importance of Cybersecurity, Security Evolution — From Legacy to Advanced, to ML and AI, Learning Cybersecurity Technologies, Skills We Need for a Cybersecurity Career, Attacker Mindset, Understanding Reactive, Proactive, and

Operational Security, Networking, Mentoring, and Shadowing, User Authentication, Network access control and cloud security, Transport level security, Web security consideration, Wireless network security, Electronic Mail Security, Knowledge Check and Certifications, Security Intelligence Resources.

MCS643- Advanced Cryptography and Network Security

This course is designed to provide the student with the critical knowledge and professional skills needed to cover advanced topics in cryptography and network security. This course covers diverse topics on cryptography and network security techniques including conventional encryption, asymmetric and symmetric cryptology, digital signatures, certificates, key exchange, key management, authentication, network access control, cloud computing security, electronic mail security, advanced crypto primitives. This course focuses on both theoretical concepts and practical applications of cryptanalysis and network security techniques.

MCS691 - Scientific Research Methodology

This course is designed to prepare students for advanced scientific research by examining how to plan, conduct, and report on research in the Computer Science field. Topics include: formulating research problems, Research Design, Qualitative and Quantitative Research, Measurement, Data Analysis, Interpretation of Data, code of ethics and plagiarism, writing scientific proposal, writing research papers and presenting a project/paper to audience. Students will also examine examples drawn from different research areas as case studies on various aspects of the principal methods.

Course Description

MCS692 - Selected Topics in Computer Science

This course provides students with critical knowledge and understanding of the concepts and practice of the hottest topics and the latest research or technology in the field of Computer Science. It will address a variety of theoretical and/or technological issues related to computer science and provides an opportunity for students to undertake a term-long software development or research project. The topic might be different from one run to another; an approval from the computer science department is required to select the course content whenever offering the course.

MCS698 - Applied Project

This course is designed to prepare the student to plan and implement a supervised master's applied project in computer science fields. It is prepared according to the steps of specialized scientific research. The student is expected to use higher-level skills to conduct critical evaluation of information to investigate a complex problem, devise and implement a creative solution to it, by adopting an organized methodology, reviewing literature and analyzing relevant data, to reach research conclusions and appropriate recommendations that hopefully contribute to applied project development at the professional and societal levels. The applied project, in its final version, is subject to the public defense and its evaluation is based on the written and oral presentation, which are prepared according to the thesis Master Thesis Guidelines at the Applied Sciences University.

MCS699 – Thesis

This course is designed to prepare the student to plan and implement a supervised master's thesis in computer science fields. It is prepared according to the steps of specialized scientific research. The student is expected to use higher-level skills to conduct critical evaluation of information to investigate a complex problem and devise creative solutions to it, by adopting an organized methodology, reviewing literature and analyzing relevant data, to reach research conclusions and appropriate recommendations that hopefully contribute to qualitative development at the professional and societal levels. The thesis, in its final version, is subject to the public defense and its evaluation is based on the written and oral presentation, which are prepared according to the thesis Master Thesis Guidelines at the Applied Sciences University.