

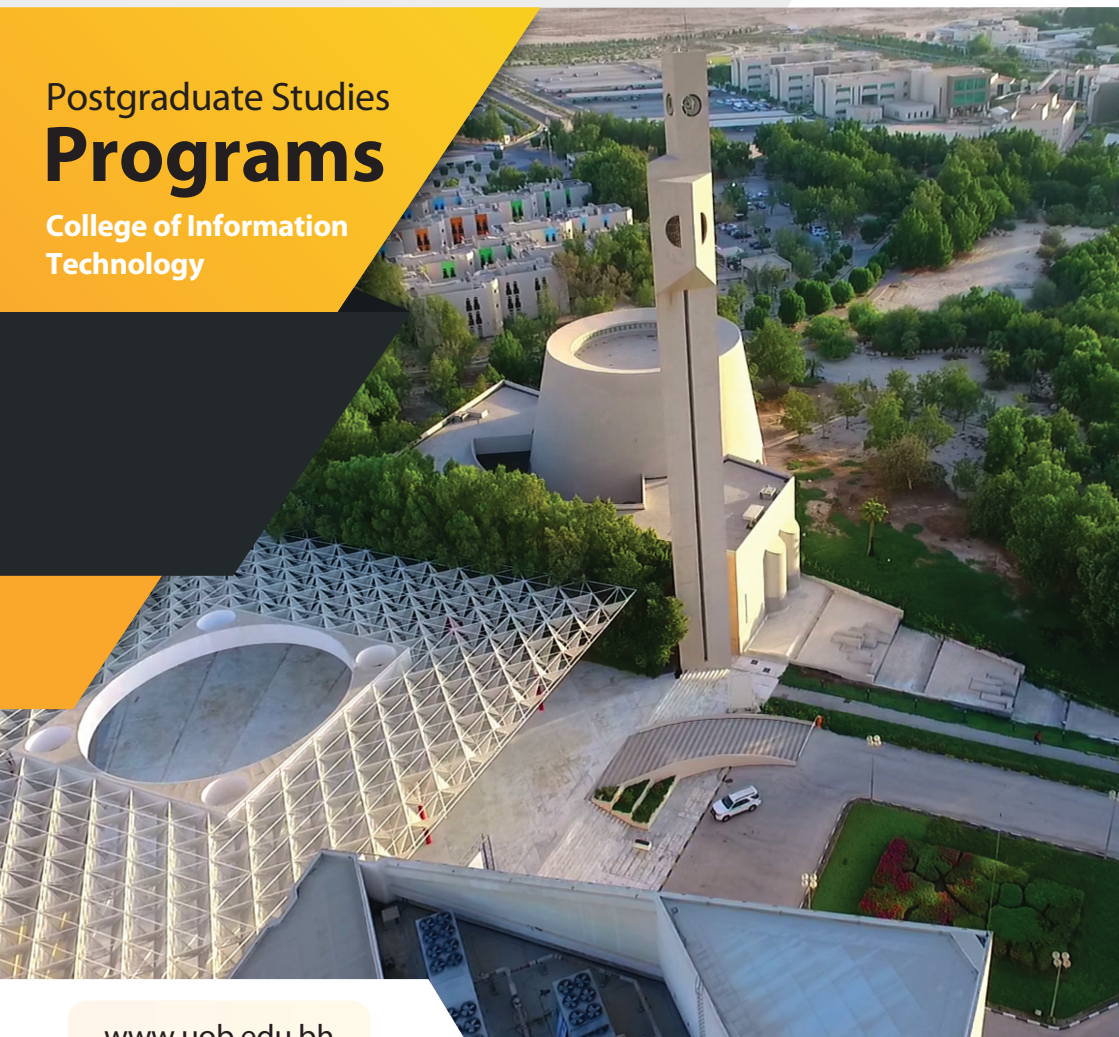


**University of Bahrain**

Deanship of Graduate Studies & Scientific Research

# Postgraduate Studies Programs

College of Information  
Technology



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# Master of Science in Cybersecurity Program

## Program Objectives

1. Gaining credibility and recognition in the field, engage successfully in career advancement within the Cybersecurity sector, achieving higher-level positions and leadership roles, and serving the needs of industry, academia, or pursuing entrepreneurial ventures.
2. Commit to life-long learning and professional development, seeking further educational opportunities, adapting to changes in the Cybersecurity landscape.
3. Contribute to the welfare of society and the advancement of the Cybersecurity profession through responsible and ethical practices.

## Program Intended Learning Outcomes

1. Demonstrate a critical knowledge of computer networks, cybersecurity concepts, principles, and theories.
2. Develop policies that comply with legal, ethical, and regulatory aspects of cybersecurity.
3. Communicate technical information effectively to diverse audiences.
4. Conduct complex risk assessment within organizations using recognized frameworks and methodologies.
5. Critically evaluate various security solutions and countermeasures to effectively mitigate potential risks, threats, and vulnerabilities in complex situations.
6. Develop secure computer systems that rigorously adhere to industry standards and constraints.
7. Develop a research project, showing individual initiatives as well as teamwork skills.

## Required Specialization for Program Admission

The applicant must hold a bachelor's degree from the University of Bahrain, or another university recognized by competent authorities, in a field related to Artificial Intelligence, Biology with minor in Computer Science, Business Administration with IT (BBA-IT), Business Informatics, Business Information Systems, Cloud Computing, Communication and Information Technology, Communication Engineering, Computer and Information Science, Computer Applications, Computer Engineering, Computer Information Systems, Computer Information Technology, Computer Networks, Computer Programming, Computer Science, Computing, Cybersecurity, Data Analytics, Design and Development of Multimedia, Electrical Engineering, Electronics Engineering, Health Information Management, Informatics, Information and Telecommunications Systems, Information Engineering, Information System Technology, Information Systems, Information Technology, Management Information Systems, Mathematics with minor in computer science, Mechatronics Engineering, Network Engineering, Physics with minor in computer science, Software Development, Software Engineering, System Engineering, Technology Management, Telecommunication Engineering.

## Study Plan

### First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCY610	Network and Information Security Management	4	0	4
ITCY614	Applied Cryptography	4	0	4
ITCY615	Research Methodology	4	0	4

## Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCY620	Incident Response and Penetration Testing	4	0	4
ITCY6xx	Elective 1	4	0	4
ITCY6xx	Elective 2	4	0	4

## Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCY690	M.Sc. Thesis	0	27	9

## Elective Courses

Course Code	Course Title	Course Hours		
		CRD	PRAC	CRD
ITCY622	Cloud Security	4	0	4
ITCY623	Threats, Exploits and Countermeasure s	4	0	4
ITCY624	Security Aspects of Internet of Things	4	0	4
ITCY625	Machine Learning	4	0	4
ITCY626	Cyber Security Architecture and Design	4	0	4
ITCY627	Selected Topics in Cyber-Security	4	0	4

# Master of Science in Machine Learning and Computational Intelligence Program

## Program Objectives

1. Competent and effective: Acquire advanced cutting-edge knowledge and skills in Machine Learning and Computational Intelligence necessary to advance their careers in IT.
2. Learn for life and innovate: Engage in exploration, innovation, research, and lifelong learning in the field of Machine Learning and Computational Intelligence.
3. Research, Ethics, and professionalism: Contribute positively to society through responsible, professional, and ethical Artificial Intelligence practice and research.

## Program Intended Learning Outcomes

1. Apply the concepts, principles and theories related to Machine Learning and Computational Intelligence and appropriate to the discipline.
2. Critically understand Machine Learning and Computational Intelligence problems and propose and develop solutions based on current research and state-of-the-art techniques.
3. Analyze challenging AI and ML problems and identify and define requirements appropriate for their solutions that meet appropriate standards and realistic constraints.
4. Design, implement, and evaluate a system, process, component, or program to meet desired needs using best AI and ML practices and standards, within realistic constraints such as economic, environmental, social, ethical, health and safety, etc.
5. Function effectively in a team by assuming different roles and demonstrating effective leadership qualities and project management skills to accomplish a common goal towards a significant project.

6. Assess professional, ethical, legal, security and social issues and responsibilities.
7. Communicate effectively both verbally and in writing with a range of audiences.
8. Engage in continuous professional development, and life-long learning.
9. Acquire, critically evaluate and apply a wide range of advanced and specialized techniques, skills, and tools necessary for Machine Learning and Computational Intelligence practice.
10. Conduct research, individually and in a team.

### **Required Specialization for Program Admission**

The applicant must hold a bachelor's degree from the University of Bahrain, or another university recognized by competent authorities, in a field related to Artificial Intelligence, Biology with minor in Computer Science, Business Administration with IT (BBA-IT), Business Informatics, Business Information Systems, Cloud Computing, Communication and Information Technology, Communication Engineering, Computer and Information Science, Computer Applications, Computer Engineering, Computer Information Systems, Computer Information Technology, Computer Networks, Computer Programming, Computer Science, Computing, Cybersecurity, Data Analytics, Design and Development of Multimedia, Electrical Engineering, Electronics Engineering, Health Information Management, Informatics, Information and Telecommunications Systems, Information Engineering, Information System Technology, Information Systems, Information Technology, Management Information Systems, Mathematics with minor in computer science, Mechatronics Engineering, Network Engineering, Physics with minor in computer science, Software Development, Software Engineering, System Engineering, Technology Management, Telecommunication Engineering.

# Study Plan

## First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITML 601	Artificial Intelligence & Natural Language Processing	4	0	4
ITML602	Machine Learning	4	0	4
ITML603	Research Methodology	4	0	4

## Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITML604	Deep Learning	4	0	4
ITML605	Robotics and Computer Vision	4	0	4
ITML608	Advanced Topics in Computational Intelligence	4	0	4

## Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITML690	MSc Thesis	0	27	9

# Master of Science in Applied Artificial Intelligence

## Program Objectives

1. Apply advanced Artificial Intelligence knowledge, techniques and tools to analyze, design, model, and solve complex problems within their domain of expertise, with consideration for ethical, societal, and business implications.
2. Engage in research and innovation by integrating multidisciplinary knowledge across intelligent systems to address emerging challenges.
3. Demonstrate a sustained commitment to lifelong learning and professional advancement, driving innovation and fostering meaningful contributions to the evolving field of applied artificial intelligence.

## Program Intended Learning Outcomes

1. Apply advanced principles of artificial intelligence and data-driven methodologies, to design and implement innovative solutions for complex, real-world problems across diverse domains.
2. Critically synthesize and evaluate cutting-edge theories, models, and methodologies of Artificial Intelligence, demonstrating a deep and integrated understanding of their applications in modern computational systems.
3. Apply advanced artificial intelligence knowledge in specialized and emerging areas such as machine learning, natural language processing, and intelligent systems.
4. Analyze and interpret high-dimensional, complex data sets using advanced machine learning, statistical, and computational techniques to uncover meaningful patterns, support data-driven decision-making, and develop intelligent predictive models.
5. Evaluate intelligent software systems and applications, leveraging modern frameworks, paradigms, and technologies relevant to multidisciplinary domains.

6. Communicate technical information effectively to diverse audiences.
7. Develop a research project, showing individual initiatives as well as teamwork skills.

## Required Specialization for Program Admission

Bachelor's degree in any non-IT field related to Science (Biology, Physics, Mathematics, Chemistry), Engineering (Civil, Architecture, Interior Architecture, Chemical, Electrical, Electronics and Communication, Process Instrumentation and Control, Mechanical), Business (Business Analytics, Entrepreneurship, International Business And Economics, Islamic Banking & Finance, Marketing, Business Management, Banking & Finance, Accounting), Health and Sports Sciences (Physical Education, Radiologic Diagnostic Technology, Pharmacy, Medical Laboratory Science, Nursing), Arts (Arabic Language and Literature, Islamic Studies, Mass Communication, Tourism, Arts and Design, English Language and Literature, History), Law, Education, Social Sciences and psychology.

## Study Plan

### First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITAAI601	Computer Programming and Data Science	4	0	4
ITAAI602	Networked Systems and Information Security	4	0	4
ITAAI603	Professional Issues and Research Methodology	4	0	4

## Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITAAI604	Big Data Applications and Analytics	4	0	4
ITAAI605	Artificial Intelligence Concepts and Applications	4	0	4
ITAAI611	Selected Topics in Applied Artificial Intelligence	4	0	4

## Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITAAI699	Thesis	0	27	9

# Doctor of Philosophy in Computing and Information Sciences Program

## Program Objectives

1. Make original, innovative and significant contributions to the scientific knowledge base in their area of research.
2. Engage in a productive research and development career in the fields of Computing and IT, including publications, grant writing and conference presentations.
3. Contribute positively to society through responsible, professional, and ethical IT practice and research.

## Program Intended Learning Outcomes- PILOs

Students of the PhD in Computing and Information Sciences Program will be able to:

1. Critically apply theories, methodologies, and knowledge to address fundamental questions in their primary area of study. (Research, Critical Thinking, Knowledge)
2. Pursue original and significant research in the discipline or an interdisciplinary or creative project. (Research, Critical and Creative Thinking)
3. Demonstrate significant and broad skills in oral and written communication sufficient to publish and communicate results of research in their field and to prepare grant proposals. (Communication)
4. Operate in a complex environment and adhere to the principles of professionalism and ethical conduct in their field and in academia. (Ethics)
5. Demonstrate, through service, the value of their discipline to the academy and community at large. (Service, Content Knowledge)
6. Critically analyze, evaluate and/or synthesize complex ideas and information to develop creative and original responses to problems and issues. (Research, Critical Thinking, Knowledge)
7. Interact productively with people from diverse backgrounds as both leaders/mentors and team members with integrity and professionalism. (Communication, Leadership)

## **Required Specialization for Program Admission**

1. The applicant must hold a master's degree from the University of Bahrain, or another university recognized by competent authorities, in a field related to Artificial Intelligence, Biology with minor in Computer Science, Business Administration with IT (BBA-IT), Business Informatics, Business Information Systems, Cloud Computing, Communication and Information Technology, Communication Engineering, Computer and Information Science, Computer Applications, Computer Engineering, Computer Information Systems, Computer Information Technology, Computer Networks, Computer Programming, Computer Science, Computing, Cybersecurity, Data Analytics, Design and Development of Multimedia, Electrical Engineering, Electronics Engineering, Health Information Management, Informatics, Information and Telecommunications Systems, Information Engineering, Information System Technology, Information Systems, Information Technology, Management Information Systems, Mathematics with minor in computer science, Mechatronics Engineering, Network Engineering, Physics with minor in computer science, Software Development, Software Engineering, System Engineering, Technology Management, Telecommunication Engineering.
2. In case the applicant is having BSc degree in IT related field and is holding MBA, the applicant has to take two bridging courses from the MSc level.

# Study Plan

## First Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS791	Research Methods	3	0	3
ITCIS792	Statistics Techniques	3	0	3
ITCIS714	Advanced Topics in AI	3	0	3

## Second Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS715	Advanced Topics in Applied Computing and Information Sciences	3	0	3
ITCIS716	Advanced Topics in Theoretical Computing and Information Sciences	3	0	3
ITCIS793	Graduate Seminar	3	0	3

## Third Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS717	Selected Advanced Topics in Computing and Information Sciences	3	0	3
ITCIS795	PhD Thesis I	-	18	6

## Fourth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS796	PhD Thesis II	0	36	12

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## Fifth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS797	PhD Thesis III	0	36	12

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## Sixth Semester

Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS798	PhD Thesis IV	0	36	12

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## Seventh Semester


Course Code	Course Title	Course Hours		
		LEC.	PRAC	CRD
ITCIS799	PhD Thesis V	0	36	12

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**For more information, please contact the following address:**

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