



# Program Specification

## (Postgraduate Programs )

Program Name: **Master of Science in Data Science**

Program Code (as per the Saudi Standard Classification of Educational Levels and Specializations): **061902**

Qualification Level: **Postgraduate (Master) Degree**

Department: **Computer Science**

College: **Faculty of Computer & Information Systems**

Institution: **Islamic University of Madinah**

Program Specification: **New**  **updated\***

Last Review Date: **2025/09/30**

\*Attach the previous version of the Program Specification.



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## A. Program Identification and General Information:

### 1. Program's Main Location:

Faculty of Computer and Information System,  
Islamic University of Madinah,  
الامير نايف بن عبدالعزيز  
Al Jamiah,  
Medina 42351,  
KSA

### 2. Branches Offering the Program (if any):

### 3. System of Study:

Coursework & Thesis  Coursework

### 4. Mode of Study:

On Campus  Distance Education  Other .....(specify)

### 5. Partnerships with other parties (if any) and the nature of each:

- Partnership Arrangement: N/A
- Type of Partnership: N/A
- Duration of Partnership: N/A

### 6. Professions/jobs for which students are qualified:

Graduating with a Master's in Data Science allows students to pursue work with a wide variety of employers, achieve administrative, consulting, and leadership positions as your expertise expands and applies for positions that bring you better life satisfaction. Some of the key job titles are as follows:

- ❖ Data Science Lecturers / Teaching Assistants
- ❖ Specialists in Data Science
- ❖ Data Science Research Assistant
- ❖ Data Scientist in Industry Private or Government
- ❖ Data Scientist in Companies
- ❖ Data Scientist in Banks
- ❖ Data Science Team Lead
- ❖ Data Science Manager
- ❖ Data Architect
- ❖ Data Engineer
- ❖ Decision Scientist
- ❖ Machine Learning Engineer
- ❖ Visual Data Analysts



The program will also help students to work in academia or pursue their PhD studies and conduct research in the domain of Data Science.

### 7. Relevant occupational/ Professional sectors:

MS programs cater to a wide range of industries, equipping graduates with advanced skills and knowledge sought after in today's job market. Some of the most relevant occupational and professional sectors include:

- **Technology:** This encompasses software development, data science, artificial intelligence, cybersecurity, and other fields of driving innovation. MS graduates can find roles as software engineers, data scientists, machine learning engineers, and cybersecurity analysts.
- **Healthcare:** With the increasing use of technology and data in healthcare, MS graduates with expertise in bioinformatics, health informatics, and data analytics are in high demand. They can contribute to areas like medical research, clinical decision support, and healthcare management.
- **Finance:** Quantitative finance, risk management, and financial technology are areas where MS graduates with strong analytical and mathematical skills can excel. They can work as quantitative analysts, risk managers, and financial data scientists.
- **Business and Management:** MS programs in business analytics, marketing analytics, and supply chain management can prepare graduates for roles in data-driven decision-making and strategic planning.
- **Education:** MS graduates in education or related fields can pursue careers in instructional design, educational technology, and research. They can also contribute to the development of innovative teaching methods and educational tools.
- **Engineering:** Specialized MS programs in various engineering disciplines can lead to careers in research and development, design, and project management.
- **Government and Public Sector:** Data analysis, policy research, and program evaluation are some areas where MS graduates can make a difference in the public sector. They can work for government agencies, non-profit organizations, and think tanks.
- **Consulting:** MS graduates with strong analytical and problem-solving skills can find opportunities in management consulting, technology consulting, and other specialized consulting fields.

### 8. Major Tracks/Pathways (if any):

Major track/pathway	Credit hours (For each track)	Professions/jobs (For each track)
1.		
2.		
3.		
...		

### 9. Exit Points/Awarded Degree (if any):





Exit points/Awarded degree	Credit hours
1.	
2.	
3.	
<b>10. Total credit hours: (37)</b>	



## B. Mission, Goals, and Program Learning Outcomes

### 1. Program Mission:

The mission of the data science program is to ensure the graduation of qualified data scientists who have a high academic competence with proven research and entrepreneurship skills to deal effectively with data centric complex problems in real-life. This will allow our graduates to pursue careers in private and public sectors for the betterment of the local and global community.

### 2. Program Goals:

The program goals of Master of Science in Data Science are to produce quality graduates who are able:

1. To provide effective and innovative computing solutions to data centric real-world problems, both local and global, by employing data science principles, tools and theories.
2. To recognize the need for, as well as to have the ability to engage in, continuing professional development.
3. To understand a whole range of professional, ethical, legal, security and social issues and responsibilities; and able to function effectively as team members, leaders, or entrepreneurs.
4. Enable students to engage in cutting-edge research and/or to pursue higher studies in the field of data science.

### 3. Program Learning Outcomes: \*

#### Knowledge and Understanding:

K1	Acquire in depth and specialized body of knowledge and understanding that covers theories, principles, and concepts in the field of data science
K2	Acquire critical knowledge and understanding of processes, materials, techniques, practices, conventions and/or terminology relevant to data science.
K3	Acquire advanced knowledge and understanding of recent developments in one or more disciplines or areas of data science;
K4	Acquire advanced knowledge and understanding of a range of established and specialized techniques of research and/or inquiry in data science.

#### Skills:

S1	Apply specialized theories, principles, and concepts in advanced contexts of data science;
S2	Assess, critically review and reflect on the main concepts, principles, and theories;
S3	Solve problems in complex and advanced contexts in the field of data science;
S4	Carry out advanced research or professional project using specialized techniques of research and enquiry in data science;



S5	Use processes, techniques, tools, instruments, and/or materials that are advanced and specialized to deal with complex and advanced practical activities;
S6	Carry out complex and advanced practical tasks and procedures in specialized areas related to the field of data science;
S7	Communicate in various forms to disseminate knowledge, skills, research results, and innovations related to data science to specialist and non-specialist audiences;
S8	Use quantitative and/or qualitative methods to process data and information in complex and advanced contexts, related to data science;
S9	Select, use and adapt advanced digital technology and ICT tools and applications to process and analyze a variety of data and information forms to support and enhance leading research and/or projects related to data science.

#### Values, Autonomy, and Responsibility:

V1	Commit to integrity, ethics, and academic practices, participate in constructive solutions to societal issues, and commit to responsible citizenship.
V2	Initiate professional planning for continuous learning and specialized work, and independently take decisions that result in a fundamental change or progress.
V3	Participate effectively in research or professional projects or groups and take full responsibility of the work and decisions and participate in developing knowledge and finding new practices and ways of thinking that contribute to fostering quality life for the community.

\* \* Add a table for each track (if any)



## C. Curriculum:

### 1. Curriculum Structure:

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Course	Required	6	17	46%
	Elective	3	9	24%
Graduation Project (if any)				
Thesis (if any)		1	8	22%
Field Experience (if any)				
Others (....)		2	3	8%
<b>Total</b>		12	37	100%

\* Add a separate table for each track (if any).

### 2. Program Courses:

Level	Course Code	Course Title	Required or Elective	Pre- Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	CSD 5102	Data Science Fundamentals	Required		3	Program
	CSD 5112	Probability and Statistical Inference	Required		3	Program
	CSG 5102	Essential Research Skills for Graduate Students	Required		2	College
	CSD 5113	Big Data Mining	Required		3	Program
Level 2	CSD 5106	Research Seminar	Required		1	College
	CSD 5115	Systems Development for Data Science	Required	CSD 5102	3	Program
	CSD 5114	Statistical Learning and Predictive Analytics	Required	CSD 5112	3	Program
	CSD 5110	Elective I – Machine Learning	Elective		3	Program
Level 3	CSD 5111	Elective II – Deep Learning	Elective		3	Program
	CSD 5201	Thesis Proposal	Required		2	College



Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	CSD 5150	Elective III - Business Intelligence with Visual Analytics	Elective		3	Program
Level 4	CSD 5300	Research Thesis	Required	CSD 5201	8	College

\* Include additional levels (for three semesters option or if needed).

\*\* Add a table for the courses of each track (if any)

### 3. Course Specifications:

Insert hyperlink for all course specifications using NCAA template (T-104)

[https://iuoffice365-my.sharepoint.com/:f:/g/personal/400273\\_iu\\_edu\\_sa/EkZl60ONoDtPlmTsy24HnJYBI3ERg9G4V6VY0uWDQOPudg?e=IV47Df](https://iuoffice365-my.sharepoint.com/:f:/g/personal/400273_iu_edu_sa/EkZl60ONoDtPlmTsy24HnJYBI3ERg9G4V6VY0uWDQOPudg?e=IV47Df)

### 4. Program learning Outcomes Mapping Matrix:

Align the program learning outcomes with program courses, according to the following desired levels of performance (I = Introduced P = Practiced M = Mastered).

Course code & No.	Program Learning Outcomes															
	Knowledge and understanding				Skills									Values, Autonomy, and Responsibility		
	K1	K2	K3	K4	S1	S2	S3	S4	S5	S6	S7	S8	S9	V1	V2	V3
CSD 5102	I	I				P			P	P				I		
CSD 5112	I			P	P	M	P		P	P	M					
CSG 5102	P		M		M		M			M						
CSD 5113	I	P			P	P	M	M			M		P		P	
CSD 5106	M					P										I
CSD 5115	I	P			P	P		P	P	M		M				
CSD 5114	I	P		M	P				P	M	M	P				
Elective I (CSD 5110)	P	I	P	P	M	M			M	M						M
CSD 5201	M	M	M		M	M	M					M		P	M	P



Elective II (CSD 5111)	M	M		M	M	M		M	P	P						
Elective III (CSD 5150)	I	M	M	M	M	M			M					M		
CSD 5300		M	M	M		M	M	M	M	M	M		M	M	M	M

\* Add a separated table for each track (if any).

## 5. Teaching and learning strategies applied to achieve program learning outcomes:

Describe teaching and learning strategies, to achieve the program learning outcomes in all areas.

Program Learning Outcomes	Proposed Teaching and Learning Strategies
<b>Knowledge Domain</b>	
<b>K1:</b> Acquire in depth and specialized body of knowledge and understanding that covers theories, principles and concepts in the field of data science;	<ul style="list-style-type: none"> <li>Lecture topics in leading edge data science concepts, theories and practices.</li> <li>Assign problems to students to develop their understanding.</li> <li>Assign literature survey.</li> </ul>
<b>K2:</b> Acquire critical knowledge and understanding of processes, materials, techniques, practices, conventions and/or terminology relevant to data science;	<ul style="list-style-type: none"> <li>Lecture topics</li> <li>Assign related case studies</li> <li>Assign topics in discussion groups</li> </ul>
<b>K3:</b> Acquire advanced knowledge and understanding of recent developments in one or more disciplines or areas of data science;	<ul style="list-style-type: none"> <li>Lecture topics</li> <li>Assign related case studies</li> <li>Assign topics in discussion groups</li> <li>Literature Survey</li> </ul>
<b>K4:</b> Acquire advanced knowledge and understanding of a range of established and specialized techniques of research and/or inquiry in data science;	<ul style="list-style-type: none"> <li>Lecture topics</li> <li>Assign related case studies</li> <li>Assign topics in discussion groups</li> <li>Literature Survey</li> </ul>
<b>Skills Domain</b>	
<b>S1:</b> Apply specialized theories, principles, and concepts in advanced contexts of data science;	<ul style="list-style-type: none"> <li>Assign problems in areas where students will apply and synthesize and develop new ideas.</li> <li>Assign literature review &amp; Gap Analysis</li> <li>Assign Homework's</li> <li>Assign brainstorming sessions.</li> </ul>
<b>S2:</b> Assess, critically review and reflect on the main concepts, principles, and theories;	<ul style="list-style-type: none"> <li>Assign problems in areas where students will apply and synthesize and develop new ideas.</li> </ul>



	<ul style="list-style-type: none"> <li>• Assign tutorials to learn the latest tools in areas of security technologies</li> <li>• Assign projects</li> <li>• Seminar sessions.</li> </ul>
<b>S3:</b> Solve problems in complex and advanced contexts in the field of data science;	<ul style="list-style-type: none"> <li>• Assign problems in data science areas where students will perform analytics on the data to acquire useful information or knowledge.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>S4:</b> Carry out advanced research or professional projects using specialized techniques of research and enquiry in data science;	<ul style="list-style-type: none"> <li>• Assign problems in areas where students will</li> <li>• apply current techniques and skills to synthesize and provide solutions.</li> <li>• Develop their response to data science issues as part of project / thesis.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>S5:</b> Use processes, techniques, tools, instruments, and/or materials that are advanced and specialized to deal with complex and advanced practical activities;	<ul style="list-style-type: none"> <li>• Assign problems in areas where students will</li> <li>• apply current techniques and skills to synthesize and provide solutions.</li> <li>• Develop their response to data science issues as part of project / thesis.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>S6:</b> Carry out complex and advanced practical tasks and procedures in specialized areas related to the field of data science;	<ul style="list-style-type: none"> <li>• Assign tasks related to writing technical reports/articles based on their solution to a problem.</li> <li>• Develop their response to data science issues as part of project / thesis.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>S7:</b> Communicate in various forms to disseminate knowledge, skills, research results, and innovations related to data science to specialist and non-specialist audiences.	<ul style="list-style-type: none"> <li>• Assign problems in areas where students will</li> <li>• apply current techniques and skills to synthesize and provide solutions.</li> </ul>



	<ul style="list-style-type: none"> <li>• Develop their response to data science issues as part of project / thesis.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>S8:</b> Use quantitative and/or qualitative methods to process data and information in complex and advanced contexts, related to data science.	<ul style="list-style-type: none"> <li>• Assign problems in areas where students will apply current techniques and skills to synthesize and provide solutions.</li> <li>• Develop their response to data science issues as part of project / thesis.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>S9:</b> Select, use and adapt advanced digital technology and ICT tools and applications to process and analyze a variety of data and information forms to support and enhance leading research and/or projects related to data science.	<ul style="list-style-type: none"> <li>• Assign problems in areas where students will apply current techniques and skills to synthesize and provide solutions.</li> <li>• Develop their response to data science issues as part of project / thesis.</li> <li>• Assign relevant literature</li> <li>• Assign project tasks</li> </ul>
<b>Value Domain</b>	
<b>V1:</b> Commitment to integrity, ethics, and academic practices, participation in constructive solutions to societal issues, and commitment to responsible citizenship.	<ul style="list-style-type: none"> <li>• Assign tutorials to learn the latest tools in data science field</li> <li>• Understand ethics and norms associated with the data</li> </ul>
<b>V2:</b> Take initiative in professional planning for continuous learning and specialized work, and independently make decisions that result in fundamental change or progress.	<ul style="list-style-type: none"> <li>• Assign problems in data science where students will analyze the impact of solutions locally or globally</li> <li>• Assign relevant literature</li> </ul>
<b>V3:</b> Lead teams with flexibility and effectiveness, take responsibility for professional development, participate in developing group performance, and enhance the quality of life.	<ul style="list-style-type: none"> <li>• Assign students to present seminars on a well-researched topic.</li> <li>• Assign students to write reports to communicate their research findings.</li> </ul>

## 6. Assessment Methods for program learning outcomes:

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.

The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least once in the program's cycle).





The program uses both direct and indirect assessment methods to assess and evaluate the intended learning outcomes as follows:

1. Direct Assessment Methods include:

- Assessment of Course Level Outcomes in each Semester: At the end of each semester, the data is collected from the current students' performances enrolled in the courses. At the course level we deploy methods such as exams, quizzes, assignments, projects etc. to assess the attainment of course learning outcomes which eventually contributes towards assessing attainment of PLOs.
- Measurement of Program Level Outcomes once an Academic Cycle: An academic cycle is divided into two academic years, each of which has two semesters. Half of the PLOs are measures in the first academic year, and rest of them in the second academic year. At the end of academic year, specified PLOs are calculated using CLO values from various courses based on the Assessment Plan.
- Measurement of PLOs at the end of an Academic Cycle: Using PLO's calculated data in the first academic year and the second academic year, all PLOs are assessed.

2. Indirect Assessment Methods include:

- **Course Exit Survey:** Before the final exam, students fill a survey for each course, which measures the student's assessment of the delivered CLOs, quality of teaching other teaching attributes.
- **Alumni Survey:** The graduates of the program give their opinions about the objectives and intended learning outcomes. The data are collected from alumni once a year.
- **Employers (industry, government, and universities):** The employers of our graduates are important elements to the success of the program. A fundamental goal of the program is to provide industry with highly qualified graduates. Feedback from employers is essential to identify the characteristics of the students/graduates and identify deficiencies that require actions to be rectified. Therefore, the employers of our alumni give their opinions about the overall quality of the program through an annual survey called Employer Survey.
- **Thesis Supervision Survey:** During the Thesis Proposal and Research Thesis courses, students are allocated supervisors to guide them. Thesis surveys are used to identify the quality of supervision provided to the students.
- **Exit Survey:** This survey is used to collect data from students who are about to graduate after completing their thesis course. The survey contains many questions related to the intended learning outcomes of the program. It also contains some questions related to other aspects of the program (Facilities, curriculum, advising system, etc.)



To calculate the Assessment of each PLO, 80% weightage is given to direct assessment, and 20% weightage is given to indirect assessment. Course Exit Survey, Alumni Survey, and Employer's survey are used to calculate the PLO assessment based on the survey results.

The Quality Assurance and Assessment Committee evaluate the collected data and prepare findings. Actions to be implemented are then approved by the program and faculty councils.

## D. Thesis and Its Requirements (if any):

### 1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

Students will be assigned to faculty supervisors using the following process:

#### Option A: Faculty Assignment

1. The Graduate Program Committee will assign students to supervisors based on the alignment of faculty expertise with students' academic and research interests.
2. Consideration will be given to faculty availability, workload balance, and student preferences.

#### Option B: Student Selection

1. Students may propose one or both supervisors of their choice, subject to faculty availability and approval by the Graduate Program Committee.
2. To initiate this process, students must submit a Supervisor Selection Form outlining their proposed supervisors and a brief rationale for their choices.
3. Faculty members must confirm their willingness to supervise the student before final approval.

The course of Research Thesis (CSD-5300) is offered in the fourth semester of the program, which is the second term of the second year. However, a student can only take the course of Thesis if he has successfully defended his Proposal at the end of the course of Thesis Proposal (CSD-5201). Ideally, the Thesis Supervision Process starts at the end of the second semester of the first year, during the course of Research Seminar (CSD-5106), in which students attend seminars from various faculty members. Each faculty member discusses his research areas, challenges, issues and potential problems that can be adopted as the thesis topic. By the end of the course, students are recommended to select a supervisor and a thesis topic.





Students are encouraged to have discussions with various faculty members about their research domains and research problems. After an agreement between a faculty member and a student, the student is required to fill an “MS Thesis commitment Form” which is signed by the student and the selected supervisor. This starts the relationship between the supervisor and the supervisee.

However, many students failed to select a supervisor and/or a thesis topic during the second semester. These students are required to complete the process until the fourth week of the third semester during the course of Thesis Proposal.

During the Thesis Registration phase in the course of Thesis Proposal, students select a research problem within the program domain and a candidate supervisor with expertise in the problem domain. They may choose a co-supervisor also. The students get approval for the supervisor and co-supervisor from the Graduate Program Committee.

Throughout the course of Thesis Proposal, the students approach their supervisors for the thesis proposal advice. The supervisors and students work together towards finalizing the thesis proposal by the end of the third semester.

The student submits the required registration forms with the research problem and the potential supervisors. All thesis registration forms are approved by the Graduate Program Committee including all the department heads, the course coordinator, and the dean of the faculty.

The student is required to draft and submit a Research Proposal in the third semester of the program and must receive subsequent approval from the Graduate Program Committee. The proposal must be evaluated by a group of faculty members including the supervisors and an evaluator. After the successful defense of the thesis proposal, the student is declared “pass” in the course of Thesis Proposal and is allowed to take the course of Research Thesis in the next semester.

## 2. Scientific Supervision:

(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/mechanisms of the scientific supervision and follow-up)

Progress of research must be monitored during the Thesis Proposal and Research Thesis courses. During the course of Proposal, student’s progress is monitored through monthly reports (evaluated by the supervisors), midterm evaluation (evaluated by the supervisors), and a final evaluation (evaluated by the supervisors and an evaluator).





During the course of Thesis, the progress of student is monitored by the Supervisor and reported to the Graduate Program Committee. Midterm progress is evaluated by the supervisor and an internal evaluator, while the final thesis is evaluated by the supervisors, internal evaluator and external evaluator.

A progress review plan should be agreed between the students and supervisors at the start of the proposal and thesis and should be followed during the entire lifetime of the thesis.

The supervisor shall mandatorily reserve a fixed timeslot (e.g., at least 2 hours) weekly for each student supervisee.

The supervisor shall decide the modus operandi for achieving the goals of the study based on the nature of the problem and his expertise.

The supervisor shall submit a monthly report (according to the follow-up report form) to the DRC showing student progress.

### 3.Thesis Defense/Examination:

(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

The thesis defense committee includes a supervisor, one senior faculty member from the program, and one senior faculty member from outside the university, preferably with relevant research expertise as of the thesis. The preliminary list of the members of the defense committee is provided by the supervisor and the student. The supervisor should forward the list to the Graduate Program Committee and then to the dean for final selection of the committee.

The defense committee shall grade the defense based on the significance of the problem addressed by the work, depth, and breadth of the solution(s) proposed rigorous and vigorous evaluation of the results, and conclusions drawn from the study. Peer-reviewed publication of the work shall certainly be appreciated and acknowledged in grading but shall not be among the mandatory requirements. After the defense committee is approved by the Dean, the supervisor shall approve the distribution of soft/hard copies of the thesis to the defense committee. Also, a soft copy of the thesis shall be made available to all individuals of the faculty interested in attending the defense. The defense committee shall provide a date and time slot for the final defense, which shall be approved by the dean. The required logistics for the defense (reservation of seminar hall, refreshments, and so on) shall be provided by the office.

The supervisor shall perform the role of moderator during the defense. He shall preside over the proceedings, familiarize the audience with the area of research, and ensure that all participants adhere to the moral and professional code of ethics during the defense. The supervisor assigns the student a score of 100, with 20 points awarded based on midterm evaluations by the



supervisor and an internal evaluator, and 60 points awarded at the thesis defense; 20 by the supervisors, and 40 by the evaluators. Each of the evaluators scores the student out of 40. The final defense score is calculated by summing these four scores, each weighted according to a predefined factor, resulting in a final mark out of 100.

## H. Student Admission and Support:

### 1. Student Admission Requirements:

The minimum requirements for admitting prospective full-time graduate students in this master's program include the fulfillment of both the general and English language requirements as stated below.

#### 1. General Requirements

The general requirements that prospective students have must include the following:

- A bachelor's degree (full-time) from a Saudi Academic Institution or a university recognized by the Ministry of Education in a related field of study related to (not limited to) Computer Science, such as, Computer Science, Data Science, Information Technology, Information Systems, etc.
- A Grade-Point Average (GPA) of at least 3.5 on a scale of 5.0 (2.50 on a scale of 4.0) or equivalent. For final admission, the degree certificate and official transcripts within sealed envelopes are required.
- The applicant must successfully pass the interview conducted by the program management.
- Applicants must obtain a minimum score of 60 on the Qiyas exam (External students are exempted from this condition).
- Adhering to other general admission requirements specified by the Islamic University of Madinah based on the Article 7, Paragraph 2 of the Regulations of Post Graduate Studies.
- At least three recommendation letters from the teaching staff who directly taught the applicant during his undergraduate courses. The recommendation letters must be sent directly by the teaching staff or signed within sealed envelopes.

#### 2. English Language Requirements

The English language proficiency requirements for prospective students must be demonstrated by one of the following:

- TOEFL – Test of English as a Foreign Language





- A minimum score of 450 (PBT-TOEFL), 45 (IBT-TOEFL), or 60 (STEP). The TOEFL result should be sent by the TOEFL center directly to the Faculty of Computer and Information Systems.
- IELTS – International English Language Testing System
  - A minimum overall score of 4.0. The IELTS result should be sent by the IELTS center directly to the Faculty of Computer and Information Systems.
- Test results should not be more than two years old at the time of application.
- Prospective students whose primary language is not English are required to provide proof of English proficiency scores prior to admission to this master program.

### 3. Selection Criteria

The Faculty of Computer and Information System at Islamic University takes in consideration world standard criteria in selecting their prospective students, which includes, but not limited to, the following:

- Prospective students must have good academic standing in their undergraduate degree program.
- Prospective students must have shown exemplary behavior and code of conduct in their previous university level studies.
- Prospective students should be able to demonstrate excellent research skills.
- Fulfilling the minimum admission requirements does not guarantee admission into this program. The final admission is subject to an assessment of the entire application and the capacity of the program

### 4. Transfer Requirements

Following are the general terms and conditions to consider an application for transfer to a master's program at the Faculty of Computer and Information Systems, Islamic University of Madinah.

1. The current university or college of the student must be recognized by the Ministry of Education.
2. The student should not be dismissed from the university from which he transfers for disciplinary reasons.
3. The student must have achieved the required average on which the admission to the specialization he wishes to transfer to is based.
4. The student should pass at least 9 credit hours in the specialization at the university from which he transfers by regular attendance.
5. The student should provide an acceptable reason for the transfer request.





6. Approval of the dean of the college to which the student wishes to transfer under the terms of transfer that are approved by the College Board and exists in the Deanship of Admissions and Registration.
7. The number of credit units that a transferred student is required to study at Islamic University may not be less than 60% (i.e. 21 Cr. Hrs.) of the total number of the required credit units for obtaining the master's degree from the university.

Please note that submitting the transfer application to the University does not mean the request is approved unless the approval of the transfer committee is issued.

#### Required Documents

- 1 - Three copies of the high school certificate and bachelor's degree.
- 2 - Three copies of the transcript ratified and stamped by the university from which he has been transferred.
- 3 - Two copies of the state ID.
- 4 - Reasons for transferring and the cause of discontinuing study if the student has discontinued study.
- 5 - A copy of the Measurement Center exams.
- 6 - The student may not withdraw his file from the university at which he studies until he receives the approval of his transfer application from the Deanship of Admissions.
- 7 - The student should keep a copy of the documents that he submits to the university.
- 8 - The student whose transfer is approved should deliver the original documents during the specified period before the start of the semester, otherwise his transfer approval shall be annulled from outside the university.
- 9 - The student may not claim the documents submitted as they are only copies.
- 10 - Identification letter from the student's guardian's employer

The application along with the rest of the documents referred to above should be submitted to the Deanship of Admissions and Registration after completing the external transfer form (the form specially designed for transfer).

- The Deanship of Admissions and Registration receives transfer applications from outside the university and sends them to the colleges concerned. Applicants for transfer shall take the exams that may be required by some specialties.
- The student who obtains the approval of the transfer committee shall be notified to deliver the originals of the required documents during the specified period to complete the procedures for his transfer and grant him a student number at Islamic University.



- The student whose transfer is approved shall apply to his college for course equivalency according to applicable procedures.
- After issuing his student number, the student shall access the academic system portal for registration and check with his college in case of any problem in registration.
- The student should take out the university card from the Deanship of Admissions and Registration.

## 5. Course Equivalency

Courses considered for equivalency must fulfil the following criteria:

1. Number of credit hours for the course under consideration must have at least the same number of credit hours of Islamic University equivalent course.
2. The course considered for equivalency must have a minimum grade of C.
3. The contents of the course(s) under consideration must cover at least 80% of the contents of the equivalent Islamic University course.
4. The last course passed on the submitted transcript should not be older than 5 years.
5. The equivalent Islamic University pre-requisite(s) by course content for any course considered for transfer should be also taken and successfully passed by the student from the previous institution.
6. If previous condition is not met, the student must take the pre-requisite(s) and retake the course under consideration at Islamic University.
7. All transfer students are required to complete Islamic University core courses, regardless of the level at which he enters the university.
8. Transfer students must also complete the university's assessment thesis courses.
9. The number of transfer credits should not exceed a maximum of 70% of the graduation requirements of credits. At least 30% of the degree course requirements must be completed in residence at Islamic University.

The Course Equivalency Committee (CEC) will recommend credit transfers for final approval.

## 2. Guidance and Orientation Programs for New Students:

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

Not Applicable

## 3. Student Counseling Services:

(Academic, professional, psychological and social)



(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level)

Advising is a responsibility shared by an advisor and the student. The advisor serves as a facilitator of communication and coordinator of learning experience through course and career planning and academic progress reviews. Academic advisors are committed to providing every student with high-quality assistance. Academic advising activities include assistance to students in planning their class schedule each semester, as well as their overall programs of study, during office hours that should be scheduled in the faculty timetable or by appointment; the counseling of students regarding career planning and graduate education; and assistance to students in transitioning to graduate study or professional work.

FCIS has established the Academic Advising Unit (AAU) at the faculty level. AAU is responsible for:

- Assigning students to academic advisors.
- Preparing orientation programs for new students.
- Updating forms and templates if needed.
- Preparing report about students who are facing difficulties during their studies.
- Ensuring that all students receive the appropriate academic counseling and advice, including both scheduling of faculty office hours and advising on program planning, subject selection and career planning.

Some specific roles and responsibilities of an academic advisor:

- Provides full support at key stages each year to establish an ongoing relationship.
- Reviews overall academic progress and reflects on development of skills and attributes.
- Discusses and explains the graduation requirements of the program and other regulations and rules of the university and department.
- Interprets academic policies and procedures.
- Discusses various program tracks offered by the department.
- Helps students to improve their study skills.
- Encourages students to meet with an academic advisor on a regular basis to ensure their academic success; and
- Discusses long-term course planning and changes to major or minor plans of study.

Each advisor must prepare a file for each student which contains detailed records of the student during his studies at the university.

The most important contents of the file are:



- Keep the student's personal data.
- Keep the student timetable for the semester.
- Keep the student academic transcript.
- Keep student midterms marks.
- Keep the students' follow-up courses.
- Keep the Drop/Add courses for the students.
- Keep the attendance and absence sheet for students and their excuses.
- Keep any decision taken against the student.
- Keep the record of any student complaints.

#### Career Guidance

The student advisors provide career resources and assistance to students throughout their academic years in the faculty.

The advisors work with students to help them choose a specific research area. Students are encouraged to attend careers.

workshops, campus-wide programs to help them formulate career goals and plans. Advisors also help students how to write professional resumes, identify internship opportunities, conduct informational interviews, apply for graduate schools (PhD), prepare for interviews, and develop job search strategies. The department establishes contacts with a variety of other representatives to whom students can be referred and students are offered opportunities, on and off campus, to network with various alumni and employers. Full time and part time internship opportunities are received regularly, and all openings are posted on the department notice board.

#### **4. Special Support:**

(Low achievers, disabled, and talented students).

FCIS is committed to providing equal opportunities to disabled, gifted and talented students through the best possible level of support and tailored services and facilities.

Generally speaking, it is expected from the students that they follow the same course towards attaining requirements for graduation, but in special circumstances individual needs of students can be taken into consideration when organizing assessments related to the courses and thesis.

These special arrangements can be made for students as appropriate and as per their needs.

Such arrangements might include the use of specialized equipment, the provision of an amanuensis or simply the allocation of additional time.

Students with a learning disability must present a signed declaration from a doctor or specialist stating that they have been diagnosed with such a disability in order for us to make provisions to accommodate their needs.





## E. Faculty and Administrative Staff:

### 1. Needed Teaching and Administrative Staff:

Academic Rank	Specialty		Special Requirements / Skills (if any)	Required Numbers		
	General	Specific		M	F	T
Professor	Computer Science	Data Science		2	N/A	2
Associate Professor	Computer Science	Data Science		3	N/A	3
Assistant Professor	Computer Science	Data Science		3	N/A	3
Technicians and Laboratory Assistant	N/A			0	N/A	0
Administrative and Supportive Staff	Support	IT		2	N/A	2
Others (specify)	N/A	N/A		0	N/A	0

## F. Learning Resources, Facilities, and Equipment:

### 1. Learning Resources:

Learning resources required by the Program (textbooks, references, and e-learning resources and web-based resources, etc.)

The FCIS assumes an indispensable function in procuring learning assets and gives the component to guarantee the standard workforce input with respect to the accessibility of the learning materials, for example, textbooks and reference materials for learning and education and furthermore to guarantee the sufficiency of the learning materials for the students. By the end of each academic year, the Facilities and Resources Committee (FRC) collects opinions of the faculty members about:

- The availability and adequacy of textbooks and reference textbooks required to support the attainment of program learning outcomes.
- Access to electronic learning resources including digital library and electronic and web-based materials
- Planning and acquisition of the latest edition textbooks, more reference books, and other digital materials.
- Planning and acquisition of classrooms.

FRC also collects feedback given by faculty members in the NCAAA course reports (end of each semester) for better planning and acquisition of textbooks, references, and other digital materials.





The faculty members evaluate the adequacy of facilities and resources including textbooks, references and other learning resources (e.g., labs, classrooms, library, etc.) through an annual survey (Facilities and Resources Survey). For example, this survey contains the following sections:

- Adequacy of existing textbooks and references.
- Adequacy of electronic resources available to students.
- Adequacy of classrooms.
- Adequacy of library resources.
- Adequacy of labs and other commuting resources.

FRC combines the opinions of faculty members and prepares a list of required textbooks and access to electronic materials. This list needs to be approved by the department and faculty councils before sending it to the deanship of library affairs for further action. FRC forwards recommendations regarding the classrooms to the department and faculty councils for further action.

With the help of the FRC, the university library has 464 textbooks and reference books available related to computer sciences, information technology, and information systems.

The other resources are available and accessed by students and faculty members such as the Saudi Digital Library (SDL), and Blackboard, which enforce and improve the nature of instructing and learning measures.

## 2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

The FCIS offers students a conducive learning environment. With a capacity for 603 students, FCIS has 13 classrooms, including 7 in the FCIS building and 6 in the Arabic language building. Every classroom has a whiteboard, a projector, a table, chairs, and student seats.

Additionally, FCIS has 14 on campus labs with a capacity of 344 students. These labs are available from 8 AM to 8 PM, from Sunday to Thursday. All labs are equipped with the latest hardware and software. All computers are equipped with standard software for productivity, creativity, web browsing, and multimedia.

The office space, classrooms, labs, and office stationery are the responsibilities of department administration. For any maintenance concerns relating to offices, labs, and classrooms, the university maintenance department is accountable. The university maintenance department is responsible for all maintenance issues (hardware and/or software) related to offices, laboratories,





and classrooms. To facilitate the service, the university maintenance department accepts maintenance requests through telephone/communication, and a management system as well.

The FCIS has laboratory supervisors to oversee the activities of operating, repairing, and updating the infrastructure of the various laboratories. The technicians at the laboratory are responsible for maintaining the equipment and keeping it in working order. Minor issues that affect students and faculty members are immediately resolved upon request; the technicians conduct systematic maintenance and update the appropriate software. Further assistance is available from the IT center personnel for networking and major hardware problems before the beginning of every semester.

The IT unit at the faculty follows the following processes for planning and acquisition of computing resources in the laboratories:

- The IT Unit prepares report containing recommendations for planning and acquisition of computing resources in the labs. The recommendations are mainly prepared according to the opinions of lab instructors and faculty members through course reports (end of each semester) and online specific form about the availability and adequacy of computing resources.
- Then, the faculty council discusses the recommendations and, if needed, a request with all technical requirements for computing resources is forwarded to the Information Technology (IT) Deanship.
- Then, the IT deanship forwards the computing resources request to the university's purchasing section.
- The purchasing department checks the request, and if approved, in coordination with the faculty, and sends it for final approval and the process of purchase is initiated.
- Upon receiving the computing resources, the provider will then perform installation of all computing resources under the supervision of IT deanship.

Library services are adequate to serve the program's needs. Textbooks and other references are available to students and faculty. The university has printed books and electronic materials. There are adequate numbers of computers and other resources available to access the library facility in the library for students and the university employees inside the library building. The university collaborates with the Saudi digital library (SDL), enabling students and staff to scan full text, copy passages, and take notes in certain instances. Many e-books in the archives allow unrestricted downloading. The university offered faculty members access to the international databases of papers, journals, and books for updated information that could be helpful through the SDL library to improve teaching and research.



Besides, the university has a well-equipped medical center where the students and university employees are used to availing medical facility.

### 3. Procedures to ensure a healthy and safe learning environment:

(According to the nature of the program)

The University provides and maintains a safe and healthy environment for the students, employees, and visitors. The students and employees are educated regarding their obligations to guarantee they avoid potential risk and to ensure the safety, health, and welfare of anyone likely to be affected.

## G. Program Quality Assurance:

### 1. Program Quality Assurance System:

Provide a link to quality assurance manual.

[Master Data Science Quality Assurance Manual.pdf](#)

### 2. Program Quality Monitoring Procedures:

The Master program in Data Science will ensure quality and continuous improvement by using the Deming Cycle methodology. The following four phases are used as procedures to monitor and ensure quality in the program:

1. Plan: Establish plans, objectives and processes required to deliver the desired results. For instance, the program has a set of plans such as program specification including mission, goals, objectives, course specification, operational plan, quality plan, research plan, assessment plan, learning outcomes at the program and course levels, KPIs measurement plan.
2. Do: implement the plans mentioned above through well-defined procedures and mechanisms. For instance, the teaching strategies are implemented and monitored according to the desired learning outcomes. In addition, the research activities are carried out as planned.
3. Check: The results of the "do phase" are gathered and evaluated. Evaluation results are compared to the expected targets. The program uses the following strategies to measure its quality:
  - a. Learning outcomes assessment: the learning outcomes at the program and course levels are measured directly and indirectly.
  - b. Program KPIs assessment: The KPIs of the program are measured annually and reported in the program report.
  - c. Course Reports: The end results of the courses are reported in the course reports.
  - d. Program Annual report: The program annual report is used to report the results of implementation for several practices.



- e. Students' overall evaluation of the quality of their learning experiences at the institution.
  - f. Overall satisfaction of faculty, staff, and students on the quality related activities
  - g. Independent Opinion. The independent opinion is reported in the annual program report.
  - h. Employer survey
  - i. Advisory board survey
  - j. Alumni survey
  - k. Accreditation agencies such as NCAAA and ABET.
4. Act: Create improvement plans based on the evaluation results and these plans to ensure that the loop of quality is closed. The improvement plans are mainly reported in the annual program report and course reports. The improvement plans must be approved. The implementation of the improvement actions should increase the quality of the overall program including its objectives and mission, student learning outcomes and KPIs.

### 3. Procedures to Monitor Quality of Courses Taught by other Departments:

Students do not need to take courses taught by other departments

The following steps are used to monitor the quality of courses taught by other departments:

1. The department chair requests other departments to send the course specifications
2. The curriculum committee reviews the course specifications and ensures their alignment to the program learning outcomes.
3. The head of the department conducts regular meetings with the students to get their feedback about the quality of the courses.
4. The instructors must submit the complete course portfolios including the course reports and assessment results of the learning outcomes and improvement actions.
5. The assessment and curriculum committee review and approve the course reports and inform other departments about the required changes in the courses.

### 4. Procedures Used to Ensure the Consistency between within the main campus:

(including male and female sections).

Not Applicable

### 5. Assessment Plan for Program Learning Outcomes (PLOs):

- The detailed Assessment Plan for Program Learning Outcomes (PLOs) is provided in the document: [LO Assesment Plan Master Data Science 1445.pdf](#)
- The program developed a detailed PLOs measurement plan.





- The program conducts regular annual surveys to assist in evaluation like:
  - Survey for employers about PLOs know the quality of graduates.
  - Survey from last year students about PLOs to know the quality of education.
  - Survey form the alumni about PLOs to know the quality of education.
  - Survey from faculty members about PLOs to know the quality of the program.

## 6. Program Evaluation Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
Program leadership.	- Department head. - Dean of faculty.	Performance charters.	At the end of the academic year
Effectiveness of teaching and Assessment.	- Students. - program manager.	- Student evaluation of each course. - program evaluation.	At the end of each academic year.
Extent of achievement of program learning outcomes (PLOs).	- Students. - alumni. - employers.	- PLO Assessment - Annual Program Report. - Course Reports - Surveys	At the end of each academic year and academic cycle.
Learning resources	- Students. - faculty.	Surveys.	At the end of each academic year.
Services	- Students. - Program members.	Surveys.	At the end of each academic year.

**Evaluation Areas/Aspects** (e.g., leadership, effectiveness of teaching & assessment, learning resources, services, partnerships, etc.)

**Evaluation Sources** (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others.)

**Evaluation Methods** (e.g., Surveys, interviews, visits, etc.)

**Evaluation Time** (e.g., beginning of semesters, end of the academic year, etc.)





## 7. Program KPIs: \*

The period to achieve the target is 2 years.

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-PG-1	Students' Evaluation of Quality of Learning Experience in the Program	80 % (4/5)	Exit Survey	Once per Year
2	KPI- PG-2	Students' evaluation of the quality of the courses	85 % (4.25/5)	Course Exit Survey	Once per Year
3	KPI-PG-3	Students' evaluation of the quality of academic supervision	85 % (4.25/5)	Thesis Supervision Survey	Once per Year
4	KPI-PG-4	Average time for students' graduation	5 Semester	Number of students graduating per year	Once per Year
5	KPI-PG-5	Rate of students dropping out of the program	15 %	Number of students dropped out of the program per year	Once per Year
6	KPI-PG-6	Employers' evaluation of the program graduates' competency	85 % (4.25/5)	Employers' Survey	Once per Year
7	KPI-PG-7	Students' satisfaction with services provided	90 % (4.5/5)	Facilities and Services Survey	Once per Year
8	KPI-PG-8	Ratio of students to faculty members	4:1	Ratio of students enrolled in the program to the number of faculty members	Once per Year
9	KPI-PG-9	Percentage of publications of faculty members	95 %	Ratio of the number of faculty members with publications to total number of faculty members	Once per Year
10	KPI-PG-10	Rate of published research per faculty member	5:1	Average number of publications by the faculty members	Once per Year





No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
11	KPI-PG-11	Citations rate in refereed journals per faculty member	20:1	Average number of citations for faculty members	Once per Year
12	KPI-PG-12	Percentage of students' publication	20 %	Ratio of the Number of students with publications to total number of students	Once per Year
13	KPI-PG-13	Number of patents, innovative products, and awards of excellence	1	Number of patents, innovative products, and awards of excellence	Once per Years

\*including KPIs required by NCAAA

## H. Specification Approval Data:

Council / Committee	Program Committee
Reference No.	
Date	

