Program Identification and General Information:

Program			
Program Title	**Genetics MS**	**Program Code**	**2307600**
Offered Degree	☒ Academic Masters		

Program General Field	
English	**Biology**
Program Specific Field:	
English	**Genetics**

Teaching Mode	**Masters**	**Doctorate**
	☒ Courses & Thesis (minimum 24 units and thesis of maximum 40% of graduation requirements)	

*** In case of professional Master and Doctorate teaching, mode should be electronic blended learning.**

Teaching Language:	☒ English	☒ Arabic
Thesis Language:	☒ English	☐ Arabic
Total Credit Units:	**35 Units**	
Expected Number of Students over First Five Years:	..15-20.. Male/Female Students	
Number of Faculty targeted for Next Five years	5-8 Faculty members	

Mission and Objectives:
Mission:

2.1.1. Department Mission Statement:
The Department of Biology aims to become a leading educational institution for the preparation of biologists who have the ability to research and know what is new in the biology of all branches, which enables them to compete locally, regionally and internationally in the branches of biology especially Genetics.

2.1.2 Program Mission Statement:
The mission of the MSc Genetics program is to provide basic education in core subjects of advance Genetics and intensive training, with an emphasis on laboratory methodology, in basic and applied Genetics, and related areas for students planning careers in Applied Genetics.

Program Goals:
Preparing a generation of qualified scientists and researchers who capable of meeting the needs of the labor market and contributing effectively to solving the scientific and technical problems facing development plans in the Kingdom of Saudi Arabia to achieve vision 2030
The general aims of the programme are that by the end of two years the student will be able to:

- Demonstrate a level of professional excellence;
- Demonstrate comprehensive knowledge of basic genetics and its relevance to genetic area
- Manage time effectively;
- Problem-solve autonomously and co-operatively with other disciplines
- Communicate effectively and courteously
- Have a keen interest in research and continuing education
- Demonstrate competency in professional life-skills in genetics filed.

Consistency between the Programs is Mission and that of the Department, College and University.

- This program is consistent with the Mission of the Department, College and University.
- Linking teaching, research and community service
- Strengthening the university's mission in providing quality education to students
- Conduct scientific research which aimed to serving the local community in Saudi Arabia

Program Ends, Objectives and Performance Indicators:

List major objectives of the program that help achieve the mission. For each measurable objective, describe the measurable performance indicators to be followed and list the major strategies taken to achieve the objectives.

Measurable Objectives	Measurable Performance Indicators	Major Strategies
Demonstrate a level of professional excellence	Quality of the product represented by the graduate student	Maintain a high degree of performance in delivering courses and practical exercises
Demonstrate comprehensive knowledge of basic genetics and its relevance to genetic area Problem-solve autonomously and co-operatively with other disciplines	• Announced Quizzes • Activities will include laboratory reports, homework, and movie quizzes. • Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. • Papers based essays	• Oral presentation • Reports and Proposals • Practical training • Internet data collection. • Seminars • Inverted class rooms

Have a keen interest in research and continuing education	• Scientific thinking in solving problems • Expanding access to previous research related to genetics	• Write report about major problems in genetic filed and suggest solvents • Proposals of the research point
Demonstrate competency in professional life-skills in genetics filed.	• Ability to assess the advantage and disadvantage of using genetic techniques • Proposing ideas for improvement in genetic right	• Scientific visits to genetic research centers • Seminars • Meagering written and practical skills

Program Importance and Rationale:

Program Characteristics in Relation to Local Counterparts:

- Genetic Master Program will develop student's research skills and practical skills, as well as enhance student's academic knowledge of the latest developments in Genetics and improve the employability of graduates and job opportunities.
- The student will take a master's degree in Genetics through extensive courses describing the latest developments in Genetic.
- The student will have the ability to apply knowledge in academic, health, industrial and environmental contexts.

Saudi Community Needs for the Program

- This program is ideal for students and scientists who wish to improve their career prospects and increase practical research experience in Saudi Arabia
- Cover the shortage in the Saudi Arabia in some related professions in the health, industrial and environmental fields

Program Targeted Job Values and Skills:

- The Master of Genetic program will provide graduates with academic, analytical and practical skills to assist them in many professions

Job Tracks for the Program's Graduates:

Graduates of Genetics master program will be able to work in

- laboratories using biotechnology on problems in industry
- medicine and agriculture; management positions in government or the private sector
- forensics laboratories
- Food science laboratories
- public health
- environmental science
- industry (where genetics applications are being dependent)
- Laboratories of Ministry of Environment, Agriculture and Water
- Laboratories of the General Authority for Food and Drug
- Genetic Research Centers
- Genetic Laboratory Technician in ministry of the health

Program's Advisory Committee

Section 3/2/1 to be filled only by programs that have departmental advisory committee or college advisory committee based on the Rector Decision **No. 4380049458 dated in 27/6/1383 Lunar calendar**. Departments where this decision still going on are not required to fill this section.

Formation of Program's Advisory Committee (A copy of the Program's Advisory Committee formation decisions to be added as Appendix 8/8)

3/2/1/2 Advisory Committee Recommendations related to:

Program Objectives:	The MSc. Program in Genetics will train students in current biomolecular technology. Quite simply, use of biotechnology is now ubiquitous in commerce and research. DNA is a universal property of living organisms, and its use in investigating and manipulating

	biological systems is constantly expanding. The aim of this program is to equip the graduate with in-depth knowledge and skills in DNA-based technology and related sciences, including the ability to carry out independent research, understand and apply existing methods, and use experimental results to guide decisions based upon scientific findings. Through a combination of lectures, laboratory and field-based training, students will learn not just concepts, but actual practice and procedures of applied genetics—students will acquire a suite of laboratory and analytical skills that are currently used in applied life and research environments. Students' technical skills are reinforced by intensive, early participation in the design and execution of their own research projects, culminating in a master's thesis. The knowledge and skills acquired by the end of academic studies will prepare students for careers in agricultural, industrial, or biomedical genetics applications, or in research-applications for management of natural resources—the universality of the techniques for exploring and analyzing DNA enables students to apply these skills across a broad array of disciplines. In addition to required coursework that provides the necessary technical and analytical skills, the program has an expanded list of approved electives, allowing students some latitude to tailor their own study plan according to their individual professional or interests.
Program Learning Outcomes:	**Knowledge and understanding** (A program graduate): • Has thorough conceptual knowledge of molecular, transmission, and population genetics; • Has in-depth knowledge of contemporary molecular-genetic methods and techniques; • Understands how to use and access the primary scientific literature; and integrate new technology into their technical skill set; • Has systematic knowledge of analytical methods for genetic data collection and processing, including use of analytical software; • Is knowledgeable about genetic methods used in agriculture, industry and/or biomedicine, molecular ecology and evolution, and is able to deploy appropriate genetic methods or develop new methods as needed. **Applying Knowledge** (A program graduate can): • assess genetic information and determine the experimental methods s/he needs for resolution of a specific scientific question • Is knowledgeable of and can operate sophisticated instrumentation used in biotechnology, and can learn and use new instrumentation as it becomes available • The graduate can independently design and implement a research project using empirical data, and the scientific literature, and apply this to practical or scientific purposes • Has ability to select research subject(s) • Has ability to formulate testable hypotheses using molecular genetic methods • Uses creative approaches to resolve scientific questions, based upon solid theoretical understanding • Can safely use laboratory equipment to generate scientific data **Making Judgements** (A program graduate): • Can discuss research results and make substantiated conclusions • Has skills of logical thinking, critical analysis, assessment and synthesis development • Can make an expert conclusion when necessary. **Communication skills** (A program graduate): • Has scientific communication skills in the English language • Uses modern information and communication technologies to communicate findings

	• Has effective scientific reporting and presentation skills **Learning skills** (A program graduate): • Can identify learning needs and plan and implement the learning process independently • Can stay current with ongoing advances in diverse areas of genetics, using the scientific and analytical skills acquired in the program **Values** (A program graduate): • Applies and maintains ethical research standards • Is aware of intellectual property issues, and maintains ethical norms in citing and using other people's ideas • Assesses and respects opinions of colleagues • Is aware of safety rules and observes them • Is equipped to promote new values in the field of genetics based on the delivered research projects
Program Teaching Strategies:	**Should include the following strategies:** • Lectures with the help of data show and power point slide show. • Discussions and Class activities. • Practical training • Internet data collection. • Seminars • Inverted class rooms • E-Learning • Teamwork • Case study • Laboratory work • Problem - based learning • Field work As well Specific teaching methods are identified for each individual program component and are listed in relevant syllabi.

Survey of Similar Programs in Local, Regional and International Universities

This programe is quite excellencies the national as well as international domain, while being designed to generate a postgraduate level of competence in an important as well as exciting field of biological Science.

Similar programs	**Local**				**Regional**		**International**		**Submitted program**	
	Program 1		**Program 2**		**Program 3**		**Program 4**			
University	King Saud university		King Abdelaziz University		Arab American university		Universidade da Coruña		Umm Al-Qura University	
College	Science		Science		Science		Science		**JUC***	
Department	Biology		Biology		Biology		Biology		Biology	
Program	Cell biology and genetics		Genetics		Molecular biology and Genotoxicity		Master's in molecular, Cellular and Genetic Biology		Genetics	
Program units and courses	**Units**	**Courses**	**Units**	**Courses**	**Units**	**Courses**	**Units**	**Courses**	**Units**	**Courses**
compulsory courses	12	6	10	4	17	6	18	6	**13**	**5**
Elective courses	12	6	15	5	18	6	18	6	**12**	**4**
Thesis - Research Project	6	1	8	1	8	1	8	1	**10**	**1**
Total	30	13	33	10	43	13	44	13	**35**	**10**

Main tracks or specializations covered by the program:
Molecular Genetics, Cytogenetics, Food safety, Gene Resources, DNA Forensic, Biocenology, Environmental genotoxic assessment

4/1/2 Curriculum Study Plan Table

Level	Course Code	Course Title	Sem**	Credit Hours	Theory/ Practical
REQUIRED CORE COURSES					
Level 1	2307610-3 Bio	Biostatistics	Sem I	3	(2+1)
	2307612-3 Bio	Advanced Cytogenetics	Sem.I	3	(2+1)
Level 2	2307620-3 Bio	Advanced Molecular Genetics	Sem.II	3	(2+1)
	2307621-2 Bio	Scientific Research Skills	Sem.II	3	(2+0)
	2307629-1 Bio	Seminar	Sem.II	1	(0+1)
ELECTIVE COURSES (An additional 12 credits hours of elective courses are required, students will select two courses in semester I and two courses in semester II based on intended research project).					
	2307613-3 Bio	Bio-labs Techniques		3	(1+2)
	2307614-3 Bio	Bioinformatics		3	(2+1)
	2307615-3 Bio	Human Genetics		3	(2+1)
	2307616-3 Bio	Genome and Food		3	(2+1)
	2307617-3 Bio	Conservation Genetics		3	(2+1)
	2307618-3 Bio	Immunogenetics		3	(2+1)
	2307622-3 Bio	Functional Genomic and Proteomics		3	(2+1)
	2307625-3 Bio	Microbial Genetics		3	(2+1)
	2307626-3 Bio	Biosafety		3	(2+1)
	2307627-3 Bio	Special Topics in Genetics		3	(2+1)
Level 3	2307688-10 Bio	Thesis		10	
*Level 4	2307688-10 Bio	Thesis			
Total				35	

*Al-Jumum University College

*Include additional levels or courses if needed
**Sem. (Semester)

4/1/3 Field or Research Components of the Study Plan

4/1/3/1 Summary of Practical or Medical Clinical Fellowship Components Required by the Program (if any):

a) Brief Description of Field Experience: **N/A**
b) Program Level (s) of Field Experience: **N/A**
c) Contact Hours of Field Experience and Time Table (Day / Week / Semester): **N/A**
d) Field Experience Credit Hours: **N/A**

4/1/3/2 Requirements of Research Project or Scientific Thesis (if any):

a) Brief Description of Research Project or **Scientific Thesis Requirements**. A research project that will lead to write up a thesis / dissertation. The research project should be an independent piece of work, appropriately guided and supported by a supervisor or other relevant member of academic staff. The research topic should be selected in consultation with a course director or supervisor, based on the subject specific free elective courses that students will choose and the research interests of the supervisors. **A project proposal** drawn up with the supervisor at the end of semester 2 in the first year, to be approved by the course director and the department council. The research project shall not be less than 4 months and should not exceed 6 months of laboratory experiments.
b) Outline of Targeted Learning Outcomes of Research Project or Scientific Thesis. **Carry out a range of advanced skills and laboratory techniques.** **A published or accepted paper should be performed before thesis discussion**

c)	The Program's Level/Stage of Doing Research Project or **Scientific Thesis** **The research project will take place in the second year after the successful completion of all core and subject specific free elective courses (total of 24 Credit Hours).**
d)	Research Project or Scientific Thesis Credit Hours: the MSc thesis / **dissertation** require **10 credit hours**
e)	Brief Description of Academic Advising and Student Support Mechanisms to Complete the Project: **Academic advisor is assigned for students to provide guidance and assistance regarding their program planning**
f)	Description of Research Project or Scientific Thesis Assessment Procedures (Including Assessment Rubrics): **The research project shall lead to the production of a thesis / dissertation that will be assessed by internal and external examiners and a *viva voc* defense.**
g)	**A published or accepted paper should be performed before thesis discussion**

Learning Outcomes in Domains of Learning, Assessment Methods and Teaching Strategy:
Matrix of Learning Outcomes, Teaching Strategies and Assessment Methods

Code	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1	Understanding facts	• Announced Quizzes • Activities will include laboratory reports, homework, and movie quizzes. • Tests will be of multiple formats, including multiple-choice, fill-in-the-blanks, short answers, and problem solving. • Papers based essays • Oral exam consisting of a presentation of one of topics taught	• Lectures with the help of data show and power point slide show. • Discussions and Class activities. • Microscopical demonstration of slides. • Practical training • Internet data collection. • Inverted class rooms • E-Learning
1.2	Understanding and applying theories and concepts		
1.3	Understanding procedures		
2.0	**Cognitive Skills**		
2.1	Applying skills / procedures of theoretical and concepts learned	• Consulting • Round table discussion • Training • Inverted classroom • preparing reports • support readings	• Seminars • Report • Proposal paper • Oral presentation • Papers based Thinking and ideas • Applied work
2.2	Critical thinking		
2.3	Creative thinking		
2.4	Problem solving		
3.0	**Interpersonal Skills & Responsibility**		
3.1	Responsibility of own learning	• Lecture, support readings, group discussions, writing reports, preparing research papers. • Conducting individual tasks, practical training, field training, Talks, Activities and homework	• written MCQ's exams • Paper oral presentation • Papers based essays • Extended literature review
3.2	Group participation and leadership		
3.3	Act responsibly-personal and professional situation		
3.4	Ethical standards of behavior		
4.0	**Communication, Information Technology, Numerical**		

4.1	Oral and written communication	• support readings, • writing reports, • preparing research papers. • practical training, • field training, • Activities and homework	• written reports • oral seminar • Summarized literature • Collecting Data • Labs sections
4.2	Use of IT		
4.3	Basic math and statistics		
5.0	**Psychomotor (if any)**		
5.1	Carrying out practical experiments in field and laboratory	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation
5.2	Awareness of laboratory safety issues and experimental ethics	Attendance and participating in all practical research project and supervising students throughout the lab experiments	Work on research project leading to write a thesis or a dissertation

Program Learning Outcomes Mapping Matrix

	Course Offering NQF Learning Domains and Learning Outcomes	**230610-**	**230612-**	**230613-**	**230620-**	**230621-**	**230614-**	**230615-**	**230616-2**	**230617-**	**230618-**	**230623-**	**230624-**	**230625-2**	**230626-**	**230627-**
1.0	**Knowledge**															
1.1	**Understanding facts**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
1.2	**Understanding and applying theories and concepts**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
1.3	**Understanding procedures**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2.0	**Cognitive Skills**															
2.1	**Applying skills / procedures of theoretical and concepts learned**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2.2	**Critical thinking**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2.3	**Creative thinking**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
2.4	**Problem solving**	A	A	A	A	A	N/A	A	A	A	A	A	A	A	A	A
3.0	**Interpersonal Skills & Responsibility**															
3.1	**Responsibility of own learning**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3.2	**Group participation and leadership**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3.3	**Act responsibly-personal and professional situation**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
3.4	**Ethical standards of behavior**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4.0	**Communication, Information Technology, Numerical**															
4.1	**Oral and written communication**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4.2	**Use of IT**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
4.3	**Basic math and statistics**	A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5.0	**Psychomotor**															
5.1	**Carrying out practical experiments in field and laboratory**	N/	A	A	A	A	A	A	A	A	A	A	N/	A	N/	A
5.2	**Awareness of laboratory safety issues and experimental ethics**	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Students

Admission Requirements for the Program:

The requirements shall be applied in accordance with the regulations in the graduate system of the university.

1. Bachelor's degree in biology.
2. The applicant should not be less than (very good) at least at the university level if the university is awarded with an estimate.
3. Passing the general abilities test for university graduates (its validity 5 years)
4. passing the TOEFL with score not less than 400 or its equivalent of IELTS certified tests (its validity 2 years) but The ITP test is not accepted.
5. Other requirements necessary for admission may be added on the recommendation of the department council and endorsed by the College Council and approved by the Deanship of Graduate Studies Council.

Learning Resources, Facilities and Equipment.

6/1 Available Learning Resources, Facilities and Equipment at the Department	Capacity	Available in Numbers
Classrooms	Approximately 40 m^2 (20 Stu.)	Available and fully equipped
Laboratories and workshops		
Lab 1	Approximately 60 m^2 (15 Stu.)	All equipment required for courses and equipment is available
Lab 2	Approximately 60 m^2 (15 Stu.)	All equipment required for courses and equipment is available
Library and information resources		
1- Books and references	College Library	College Library
2- Digital resources and data bases	University's library	University's library and Data bases

Scientific Research and Projects:

Main Research Domains at the Department:

- Genetics
- Molecular
- Animal and Plant Sciences
- the Environment assessment
- Biotechnology
- Food Science
- forensic