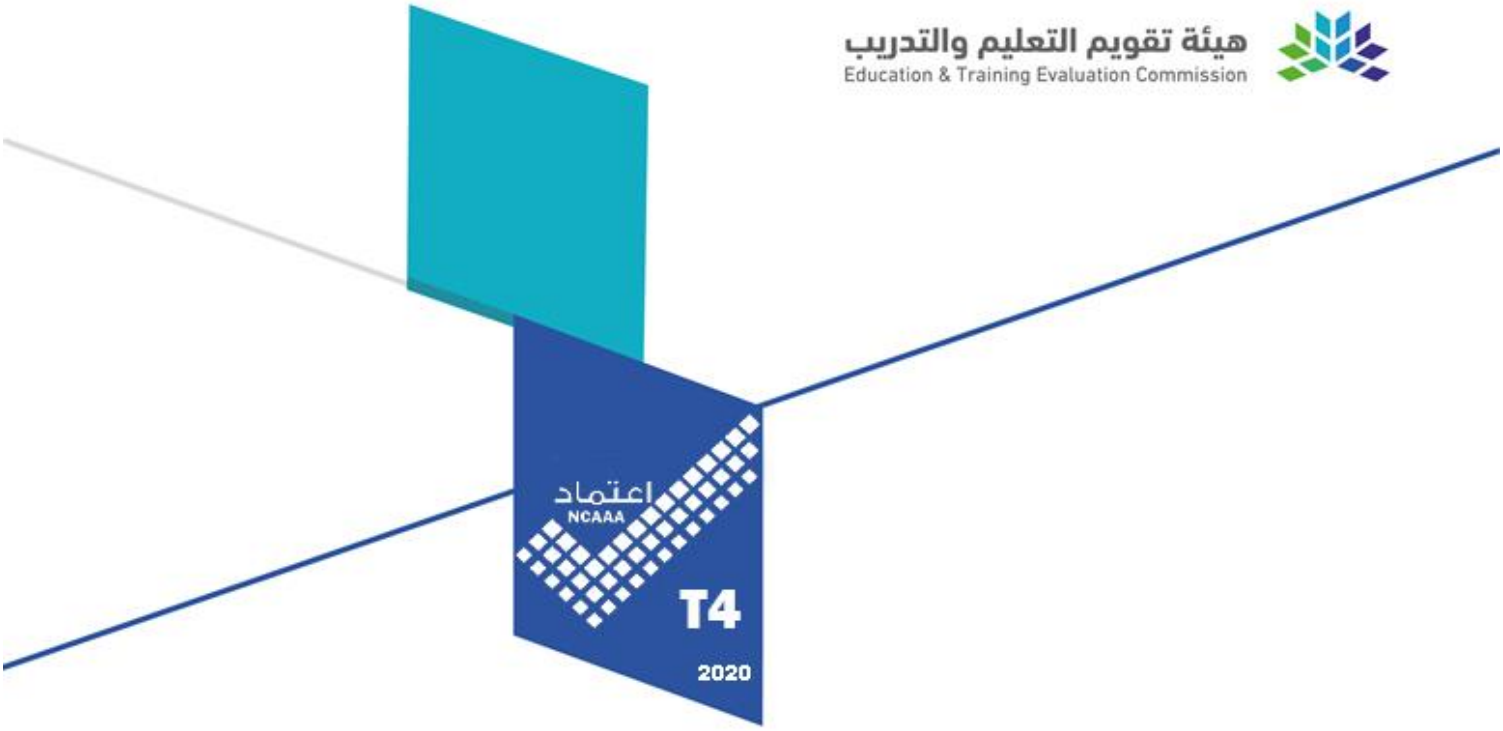
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	Microbial Genetics
Course Code:	351 MBIO
Program:	Microbiology (B.Sc.)
Department:	Botany and Microbiology
College:	Science
Institution:	King Saud University

Table of Contents

A. Course Identification

1. Credit hours:	3 (2+0+1)
2. Course type	
a.	University ☐ College ☐ Department ☒ Others ☐
b.	Required ☒ Elective ☐
3. Level/year at which this course is offered:	6th Level
4. Pre-requisites for this course (if any)**:**	MBIO140
5. Co-requisites for this course (if any)**:**	None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	100%
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Distance learning**	-	-
5	**Other**	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

Overview of basic genetic concepts (DNA, RNA, translation, and transcription)-Gene expression and regulation-Gene transfer (conjugation, transduction, and transformation)-Transposition; site-specific recombination and homologous recombination-Mutation and DNA repair. The basic microbial genetics techniques including gene cloning, polymerase chain reaction (PCR) and quantitative PCR and emerging technologies such as 'Next Generation' DNA sequencing strategies.

2. Course Main Objective

The main objectives of this course are;

- To introduce students to basic concepts of microbial genetics.
- To provide students with knowledge on gene regulation and transfer mechanisms
- To provide students with knowledge on DNA recombination, mutations and DNA repair.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	At end of the course, the student will be able to know the complete structures of DNA/RNA components.	K4
1.2	At end of the course, the student will be able to understand molecular basis of genetics (replication, transcription, translation, genetic code, protein structures) and the mechanism of regulation of gene expression.	K4
1.3	At end of the course, the student will be able to explain the ways of transmission of genetic material (conjugation, transduction, and transformation) and to be able to use these as genetic tools	K4
1.4	At end of the course, the student will be able to describe the different types of recombination, the effects of different point mutations and the different forms of DNA repair.	K4
2	**Skills:** By the end of this course, students will be able to	
2.1	At end of the course, the student will be able to operate the correlated instruments and devices to microbial genetics techniques.	S1
2.2	At end of the course, the student will be able to build a strong background in the principles/methods of microbial genetics and 'Next Generation' DNA sequencing strategies.	S1
2.3	At end of the course, the student will be able to improve scientific writing skills.	S2
2.4	At end of the course, the student will be able to improve presentation skills and gain experience with online databases.	S3
3	**Values:** By the end of this course, students will be able to	
3.1	At end of the course, the student will be able to work cooperatively in a small group environment.	V1

C. Course Content (Theory)

No	List of Topics	Contact Hours
1	Genetic material in microbes; DNA Structure and Replication	6 (4+0+4)
2	Bacterial Gene Expression; Transcription, Translation, Genetic code and Protein structures.	6 (4+0+4)
3	Regulation of Gene Expression.	6 (4+0+4)
4	Gene transfer; Conjugation and conjugative plasmids / M1 Exam.	3 (2+0+2)
5	Gene transfer; Transformation.	3 (2+0+2)
6	Gene transfer; Bacteriophages and Transduction.	3 (2+0+2)
7	Transposition and site-specific recombination / M2 Exam.	6 (4+0+4)
8	Homologous recombination.	6 (4+0+4)
9	Mutation & DNA repair.	6 (4+0+4)
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	At end of the course, the student will be able know the complete structures of DNA/RNA components.	Lecture (using PowerPoint presentation and illustrations). In-class discussion	Quizzes, Midterm exams, Final exam
1.2	At end of the course, the student will be able understand molecular basis of genetics (replication, transcription, translation, genetic code, protein structures) and the mechanism of regulation of gene expression.	Lecture (using PowerPoint presentation and illustrations). In-class discussion Homework	Quizzes, Midterm exams, Final exam, Performance-based assessments using rubrics.
1.3	At end of the course, the student will be able explain the ways of transmission of genetic material (conjugation, transduction, and transformation) and to be able to use these as genetic tools	Lecture (using PowerPoint presentation and illustrations). In-class discussion Homework	Quizzes, Midterm exams, Final exam, Performance-based assessments using rubrics.
1.4	At end of the course, the student will be able describe the different types of recombination, the effects of different point mutations and the different forms of DNA repair.	Lecture (using PowerPoint presentation and illustrations). In-class discussion	Quizzes, Midterm exams, Final exam
2.0	**Skills**		
2.1	At end of the course, the student will be able operate the correlated instruments and devices to microbial genetics techniques.	Practical activities	Practical exam
2.2	At end of the course, the student will be able build a strong background in the principles/methods of microbial genetics and 'Next Generation' DNA sequencing strategies.	Practical activities	Practical exam
2.3	At end of the course, the student will be able improve scientific writing skills.	Writing lab reports.	Performance-based assessments using rubrics.
2.4	At end of the course, the student will be able improve presentation skills and gain experience with online databases.	-Reading and evaluating scientific articles. - Oral presentation. -Searching throw the internet.	Performance-based assessments using rubrics.
3.0	**Values:**		
3.1	At end of the course, the student will be able work cooperatively in a small group environment.	Practical activities.	Direct observation using rubrics

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First exam	7th	13
2	Second exam	11th	13
3	Final practical exam	13 th	30
4	Final theoretical exam	16 th	40
5	Homework, quiz, tasks.....		4
6			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Email, blackboard and faculty personal website
- Office hours
- Practical support

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	- L. Snyder, J.E. Peters, T.M. Henkin & W. Champness (2013) *Molecular Genetics of Bacteria*. ASM Press, 4th Ed. - Uldis S.N. and Ronald Y.E. (2002) *Modern Microbial Genetics*. 2nd Ed, Wiley & Sons, Incorporated, John. Pages 672.
Essential References Materials	http://www.asbmb.org/
Electronic Materials	https://www.ncbi.nlm.nih.gov/
Other Learning Materials	Microsoft office package

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Modern lecture rooms equipped with all materials.
Technology Resources (AV, data show, Smart Board, software, etc.)	Computer room containing at least 20 systems connected to the internet to be used by the students
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Availability of chemicals, glassware and equipment relevant to the course material Safety facilities

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching & assessment, learning resources	Students, Graduates, teaching staff	Student's questionnaires and course reports (indirect)
Achievement of students and learning outcomes	Teaching staff and students	practical and theoretical exams, reports, Quizzes (direct)
Quality of learning resources	Student, Teaching staff, internal and external auditors	Course Survey and visits (indirect)
Curriculum and learning resources	Students, teaching staff	Course evaluation surveys (indirect)
Availability of Facilities and Equipment	Students and teaching staff	Student and teaching staff questionnaires.

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	**Academic Accreditation and Evaluation Committee**
Reference No.	Update-1443
Date	7/10/1443 H