

**Kingdom of Saudi Arabia**

**The National Commission for Academic Accreditation &  
Assessment**

**COURSE SPECIFICATION**

**Biotechnology**

Bio 414

# Course Specification

|   |
|---|
| Institution <b>King Khalid University</b>                           |
| College/Department <b>College of Science/ Department of Biology</b> |

## A Course Identification and General Information

|   |
|---|
| 1. Course title and code: <b>Biotechnology- Bio. 414</b>  |
| 2. Credit hours <b>2 h</b>  |
| 3. Program(s) in which the course is offered.<br>(If general elective available in many programs indicate this rather than list programs)<br><br><b>Science College - Department of Biology</b> |
| 4. Name of faculty member responsible for the course<br><b>Dr. Ashraf Haider</b>  |
| 5. Level/year at which this course is offered <b>first term – 1433 – 1434 H</b>   |
| 6. Pre-requisites for this course (if any)<br><b>General Genetics</b>   |
| 7. Co-requisites for this course (if any)<br><b>Molecular and Cytogenetics</b>  |
| 8. Location if not on main campus   |

## B Objectives

1. Summary of the main learning outcomes for students enrolled in the course.

**The course will expand the student's knowledge of how to use the modern techniques in molecular genetics and genetic engineering to improve the genome structure of economic plants and animals.**

2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)

- 1. The course material in the form of Power point presentations will be deposited as pdf files on the department Website that could be accessed by the students enrolled in the course.**
- 2. Assignments, Quizzes, and any other material will be posted on an e-learning home page of the course.**

**C. Course Description** (Note: General description in the form to be used for the Bulletin or Handbook should be attached)

| 1.1 Topics to be Covered   |             |               |
|--|-------------|---------------|
| List of Topics   | No of Weeks | Contact hours |
| <b>The concept of Biotechnology</b>  | <b>1</b>    | <b>2</b>      |
| <b>Applications of Biotechnology (PCR)</b>   | <b>1</b>    | <b>2</b>      |
| <b>Applications of Biotechnology in Medicine</b>   | <b>1</b>    | <b>2</b>      |
| <b>Role of biotechnology in; genetic diagnosis – forensic – DNA finger printing.</b>   | <b>1</b>    | <b>2</b>      |
| <b>The role of biotechnology in production of transgenic animals – role of biotechnology in Artificial insemination</b>  | <b>1</b>    | <b>2</b>      |
| <b>Role of biotechnology in medicine (gene therapy and its definition, methods of gene therapy, levels of gene therapy and its applications; cancer research, blood research, diabetes research and renal failure diseases).</b> | <b>1</b>    | <b>2</b>      |
| <b>Methods to introduce foreign genes into plant cells.</b>  | <b>1</b>    | <b>2</b>      |
| <b>Microprojectile bombardment method</b>  | <b>1</b>    | <b>2</b>      |
| <b>Agrobacterium-mediated method</b>   | <b>1</b>    | <b>2</b>      |
| <b>Plant tissue culture</b>  | <b>1</b>    | <b>2</b>      |
| <b>Development of transgenic plants resistant to viral diseases</b>  | <b>1</b>    | <b>2</b>      |
| <b>Development of transgenic plants tolerant to drought and salinity</b>   | <b>1</b>    | <b>2</b>      |
| <b>Characteristics of transgenic plants</b>  | <b>1</b>    | <b>2</b>      |
| <b>Risk assessment and biosafety control</b>   | <b>1</b>    | <b>2</b>      |

|                    |              |                                      |        |
|--------------------|--------------|--------------------------------------|--------|
| Lecture: <b>28</b> | Tutorial: -- | Practical/Field work/Internship: --- | Other: |
|--------------------|--------------|--------------------------------------|--------|

3. Additional private study/learning hours expected for students per week. (This should be an average for the semester not a specific requirement in each week)

NA

#### 4. Development of Learning Outcomes in Domains of Learning

For each of the domains of learning shown below indicate:

- A brief summary of the knowledge or skill the course is intended to develop;
- A description of the teaching strategies to be used in the course to develop that knowledge or skill;
- The methods of student assessment to be used in the course to evaluate learning outcomes in the domain concerned.

##### **a. Knowledge**

(i) Description of the knowledge to be acquired

1. Genetic engineering
2. DNA technology
3. Biotechnology
4. Genetic modification
5. Gene therapy
6. GMOs

(ii) Teaching strategies to be used to develop that knowledge

- **Lectures**
- **Multi-media, videos , animations .....etc.**

(iii) Methods of assessment of knowledge acquire

**Two theoretical exams per semester accounts for 50% of final assessment. End of the semester examination with combination of deferent types of questions such as matching, multiple choice, short essay accounts for other 50%.**

##### **b. Cognitive Skills**

|   |
|---|
| <p>(i) Description of cognitive skills to be developed</p> <ol style="list-style-type: none"> <li>1. <b>Understanding the concept of biotechnology</b></li> <li>2. <b>Understanding the applications of biotechnology in medicine</b></li> <li>3. <b>Understanding the applications of biotechnology in agriculture.</b></li> </ol>           |
| <p>(ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> <li>• <b>Presentation of some instruments in the department e.g. PCR</b></li> <li>• <b>Lectures</b></li> </ul>  |
| <p>(iii) Methods of assessment of students cognitive skills</p> <ol style="list-style-type: none"> <li>1. <b>In class MCQ's Quizes</b></li> <li>2. <b>theoretical exams</b></li> <li>3. <b>oral discussion</b></li> </ol>   |
| <p><b>c. Interpersonal Skills and Responsibility</b></p>  |
| <p>(i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ol style="list-style-type: none"> <li>1. <b>Work independently and as a team work</b></li> <li>2. <b>Manage recourses, time and other members of the group</b></li> <li>3. <b>Communicate results of work with others</b></li> </ol> |
| <p>(ii) Teaching strategies to be used to develop these skills and abilities</p> <ol style="list-style-type: none"> <li>1. <b>presentations in the central laboratory in the department</b></li> <li>2. <b>Oral communications with the students</b></li> </ol>   |
| <p>(iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <p><b>Writing short assays in certain topic related to the course</b></p>  |
| <p><b>d. Communication, Information Technology and Numerical Skills</b></p>   |

|  |
|--|
| (i) Description of the skills to be developed in this domain.<br><br><b>Use of computer programs</b>   |
| (ii) Teaching strategies to be used to develop these skills<br><br>1. <b>Using computer programs in the course requirements</b><br>2. <b>Visits to the central laboratory.</b> |
| (iii) Methods of assessment of students numerical and communication skills<br><br>1. <b>In class MCQ's Quizes</b><br>2. <b>theoretical exams</b><br>3. <b>oral discussion</b>  |
| <b>e. Psychomotor Skills (if applicable)</b>   |
| (i) Description of the psychomotor skills to be developed and the level of performance required<br><br><b>Not applicable</b>   |
| (ii) Teaching strategies to be used to develop these skills<br><br><b>Not applicable</b>   |
| (iii) Methods of assessment of students psychomotor skills<br><br><b>Not applicable</b>  |

| <b>5. Schedule of Assessment Tasks for Students During the Semester</b> |  |           |                                |
|---|--|-----------|--------------------------------|
| Assessment  | Assessment task (eg. essay, test, group project, examination etc.) | Week due  | Proportion of Final Assessment |
| 1   | <b>Quiz 1</b>  | <b>6</b>  | <b>5%</b>                      |
| 2   | <b>First Exam</b>  | <b>7</b>  | <b>20%</b>                     |
|   | <b>Quiz 2</b>  | <b>11</b> | <b>5%</b>                      |
| 3   | <b>Second Exam</b>   | <b>12</b> | <b>20%</b>                     |
| 4   | <b>Final Exam</b>  | <b>14</b> | <b>50%</b>                     |

## D. Student Support

1. Arrangements for availability of teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week)

**10 Office hours / week**

## E Learning Resources

1. Required Text(s)

- Williams, J.G. and Patient, R.K. (1988) *Genetic Engineering*. IRL Press, Eynsham, Oxford, England.

2. Essential References

- Brown, T.A. (1986) *Gene Cloning: An Introduction*. T.J. Press, Padstow, Cornwall, England.

3- Recommended Books and Reference Material (Journals, Reports, etc) (Attach List)

4- Electronic Materials, Web Sites etc

**Websites on the internet that are relevant to the topics of the course**

5- Other learning material such as computer-based programs/CD, professional standards/regulations

**Multimedia associated with the text book and the relevant websites**

## F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (ie number of seats in classrooms and laboratories, extent of computer access etc.)

1. Accommodation (Lecture rooms, laboratories, etc.)

**50 seats/ class room  
Computer access with data show and internet**

2. Computing resources

**Computer room containing about 15 computers**

3. Other resources (specify --eg. If specific laboratory equipment is required, list requirements or attach list)

**Data show**

**Overhead projector  
Models**

## **G Course Evaluation and Improvement Processes**

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

**Course evaluation by student  
Student-faculty meeting**

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

**Peer consultation on teaching  
Discussion with the group of faculty teaching the same course  
Departmental council discussions**

3 Processes for Improvement of Teaching

**Conducting Departmental workshops given by experts  
Periodical departmental revisions of each method of teaching  
Monitoring of teaching activities by senior faculty members  
Development of the parent relation between the teacher and the students.**

4. Processes for Verifying Standards of Student Achievement (eg. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)

**Assigning group of faculty members teaching the same course to grade some question for various students**

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- 1. The course material and learning outcomes are periodically reviewed and the changes to taken are approved by the departmental and the higher councils**
- 2. The head of the department take the responsibility of implementing the proposed change.**
- 3. Periodical meetings with outstanding students in the course to discuss the problems that face them in the course**
- 4. Comparison between similar courses in relevant faculties from different universities.**