|  |  |
| --- | --- |
| **Course Title:** | Biochemical Instrumentation Techniques |
| **Course Code:** | **MBI 334** |
| **Program:** | **BSc of Science /Microbiology** |
| **Department:** | **Botany & Microbiology** |
| **College:** | **Science** |
| **Institution:** | **King Saud University** |

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# A. Course Identification

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1. Credit hours:** 2(1+1) | | | | | | |  | | | | | | | | | |
| **2. Course type** | | | | | | | | | | | | | | | | |
| **a.** | University | |  | College | | | |  | Department | | | | **√** | Others |  |  |
| **b.** | | Required | | | **√** | Elective | | | |  |  | | | | | |
| **3. Level/year at which this course is offered:** | | | | | | | | | | | | Sixth Level | | | | |
| **4. Pre-requisites for this course** (if any)**:**  MBIO 250 & MBIO 260 & MBIO 270 & MBIO 280 | | | | | | | | | | | | | | | | |
| **5. Co-requisites for this course** (if any)**:** | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | |

## 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** | 15 |
| **2** | **Laboratory/Studio** | 30 |
| **3** | **Tutorial** |  |
| **4** | **Others** (specify) |  |
|  | **Total** | 45 |

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description Basic understanding of the operational principles and application of various instrumental techniques commonly used. It is designed to cover ultracentrifuge atomic absorption spectrophotometry (AAS), Electrophoresis ,all types of chromatography including , gas chromatography(GC), highperformance liquid chromatography (HPLC), Protein isolation and purification .DNA extraction and analysis. |
|  |
| 2. Course Main Objective |
| * Understanding the basic of the operational principles and application of various instrumental techniques commonly used * Ability to operate of different instruments * Following the update reaches through Internet exploring. |

## 3. Course Learning Outcomes

| **CLOs** | | **Aligned****PLOs** |
| --- | --- | --- |
| 1 | **Knowledge and Understanding** |  |
| 1.1 | Recognize the different Biochemical instruments |  |
| 1.2 | Define the different applications of various Biochemical instruments |  |
| 1.3 | Aware with the update research in this field. |  |
| 1.4 | List the principal features and uses of the different Biochemical instruments |  |
| **2** | **Skills :** |  |
| 2.1 | Explain the ideal methods using various Biochemical instruments |  |
| 2.2 | Summarize the advantages and disadvantages of Biochemical instruments applications |  |
| 2.3 | Evaluate and justify the benefits of Biochemical instruments in the microbiological labs |  |
| 2.4 | Distinguish between different instruments used for similar purposes |  |
| **3** | **Values:** |  |
| 3.1 | Demonstrate the ability to work independently or as a part of effectively team. |  |
| 3.2 | Analyzing project results in a group. |  |
| 3.3 |  |  |
| 3... |  |  |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Orientation and Introduction | 1 |
| 2 | General laboratory equipment (Autoclave, Incubators, Water bath, pH meter; Vortexer etc.) | 1 |
| 3 | Microscopy (Light Microscope and Electron Microscopy) | 2 |
| 4 | Spectrophotometry | 2 |
| 5 | Gel Electrophoresis | 2 |
| 6 | Polymerase Chain Reaction (PCR) | 1 |
| 7 | Chromatography | 1 |
| 8 | Thin layer chromatography (TLC) | 1 |
| 9 | Gas chromatography (GC) | 1 |
| 10 | High-performance liquid chromatography (HPLC) | 1 |
| 11 | Revision | 1 |
| **Total** | |  |

# 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 and Understanding** | | |
| 1.1 | Recognize the different Biochemical instruments | Lecture - Group Discussion | Exams - Debates |
| 1.2 | Define the different applications of various Biochemical instruments | Lecture | Exams - quizzes |
| 1.3 | List the principal features and uses of the different Biochemical instruments | Lecture | Written exams |
| 1.4 | Aware with the update research in this field. | Research activities | Written assignment |
| **2.0** | **Skills** | | |
| 2.1 | Explain the ideal methods using various Biochemical instruments | Lecture – small group discussions | Exams – quizzes |
| 2.2 | Summarize the advantages and disadvantages of Biochemical instruments applications | Lecture - Research activities | Essays - assignment |
| 2.3 | Evaluate and justify the benefits of Biochemical instruments in the microbiological labs | Project – research activities | Exams – essays |
| 2.4 | Distinguish between different instruments used for similar purposes | Lecture – debates - research activities | Exams - presentations |
| **3.0** | **Values** | | |
| 3.1 | Demonstrate the ability to work independently or as a part of effectively team. | Project – small group work - group discussion | Group presentations and reports |
| 3.2 | Analyzing project results in a group. | Group discussion - debates | Presentation - demonstrations |
| … |  |  |  |

## 2. Assessment Tasks for Students

| **#** | **Assessment task\*** | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| **1** | First term exam. | 7 | 15/100 |
| **2** | Second term exam. | 13 | 15/100 |
| **3** | Laboratory exam. | 14 | 30/100 |
| **4** | Final exam. | 15 | 40/100 |
| **5** |  |  |  |
| **6** |  |  |  |
| **7** |  |  |  |
| **8** |  |  |  |

**\*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 :** |
|  |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** |  |
| **Essential References Materials** |  |
| **Electronic Materials** |  |
| **Other Learning Materials** |  |

## 2. Facilities Required

| **Item** | **Resources** |
| --- | --- |
| **Accommodation**  (Classrooms, laboratories, demonstration rooms/labs, etc.) | and classrooms Laboratories |
| **Technology Resources**  (AV, data show, Smart Board, software, etc.) | Smart Board |
| **Other Resources**  (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) |  |

# G. Course Quality Evaluation

| **Evaluation**  **Areas/Issues** | **Evaluators** | **Evaluation Methods** |
| --- | --- | --- |
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**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** |  |
| **Reference No.** |  |
| **Date** |  |